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INTERNATIONAL EXHIBITION,

PHILADELPHIA, 1876.

CATALOGUE

OF THE

CENTENNIAL EXHIBIT

OF THE

GEOLOGICAL SURVEY

OF

NEW JERSEY.

LOCATION: MAIN BUILDING, T, 70.

ADDRESS:

PROF. GEO. H. COOK, STATE GEOLOGIST,

NEW BRUNSWICK, N. J.

1876.

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INTRODUCTION.

New Jersey is one of the original thirteen States of the Union. It lies almost central on the eastern border of the United States. Being easy of access from the ocean, enjoying a mild climate, and having a fertile soil, its natural advantages were appreciated and improved at an early day. Farming was the first business of its people, but the manufacture of iron was begun as early as 1682; mining on an extensive scale was carried on for many years before the revolution, and a direct trade with the West Indies and with Europe was established at several places.

The area of the State is 7,576 square miles, and its population in 1870 was 906,096. It is the thirty-third State in size, and the seventeenth in population, while in wealth it is the eighth; in value of manufactured products it is the seventh; in value of mining products the eleventh; and in the products of agriculture the twentieth.

The development of its natural resources has long received the attention of its authorities. A geological survey of the State was made by the late Prof. Henry D. Rodgers, in 1836–7. A more elaborate survey was begun by the late Dr. Wm. Kitchell, in 1854, and was continued through the years 1855–6, when it was suspended; but was resumed under its present organization in 1864, and has been continued in operation from that time onward. The economical applications of a scientific survey have been kept prominently in view in the whole course of the work, and the results have justified the wisdom of this course.

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The value of farm lands has increased from year to year, and the price per acre is greater than in any other State in the Union. The amount of farm and garden products is adequate to the supply of the whole population.

The yield of the iron mines has had a steady increase for many years past, and in 1873 no less than 665,652 tons of iron ore were mined. The depression in the business of the country has lessened the demand for ore, but about 400,000 tons have been mined the past year. The rich mines of zinc continue to yield an abundant supply of ore of the finest quality. 17,500 tons were mined in 1873, and not far from 10,000 tons in 1875.

The clay for fire-bricks, pottery, and other uses, is worked to the great advantage of our manufacturers, and the demand for it is very large. The aggregate annual value of this product, in its raw state, is estimated at $1,000,000, and the manufactured articles from it at an equal sum additional. The green-sand marl dug for use on the farm lands amounts annually to from 150,000 to 200,000 tons, and the lime burned for agricultural use cannot be ascertained accurately, but it is several hundred thousand bushels.

The construction of railways, roads and canals, so as to supply cheap and expeditious communication between the great markets of the country and the districts of agricultural, manufacturing and mining production, has fully kept pace with the other developments of industrial progress. There are in the State over 1200 miles of railway, a considerable portion of which is double track, and some of it has three and even four lines of tracks. This gives at least a mile of railway for every five square miles of territory, brings a line of railway within a distance of five or six miles of almost every dwelling, and makes it possible for most of the people to visit New York or Philadelphia, transact business there, and return to their homes on the same day.

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The increase in the wealth of the State is seen in the valuation of its real estate and personal property, which was, in 1850, $200,000,000; 1860, $467,000,000; 1870, $940,976,064.

The geological structure and formation of a country furnishes the key to its stores of mineral and agricultural wealth, directs the course which its roads and railroads must take, shows its lines of natural drainage, its sources of water supply and water power, and provides the locations best adapted for the healthful residences of man.

To ascertain, describe and make known the Geology of New Jersey, as thus defined, is the object of this Centennial Exhibit of rocks, ores, minerals, and other natural products, and of the accompanying geodetic, topographic, geological, mine and drainage maps.

All the larger geological formations of the United States, except the coal formation, are found in this State. They occur in parallel belts, or zones, usually some miles in breadth, which traverse the State in a northeast and southwest direction; and they are so regular in this respect, that a person may travel on a northeast and southwest road from one side of the State to the other, and see but a single geological formation. But, on the contrary, if he should journey from Barnegat, on the Atlantic coast, northwest to Port Jervis, on the Delaware, he would cross every formation in the State.

The collection of rocks shown has representative specimens from the Azoic, Silurian, Devonian, Triassic, Cretaceous, Tertiary, Drift, and Recent Formations. A short description of each of these is inserted at the head of its proper division in the catalogue.

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CATALOGUE.

AZOIC FORMATIONS.

[THOSE MARKED THUS * ARE NOT ON EXHIBITION, OWING TO WANT OF SPACE.]

The Azoic Formations are the Archaic of Dana, and the Laurentian of Canada; they are the oldest of the geological series, and are made up of granitic, gneissic, and other crystalline rocks, and contain no fossils. They are the material composing the mountain ranges which extend across the northwestern part of the State, and are known by the names of Ramapo, Warwick, Hamburgh, Pochuck, Schooleys, Mine, Musconetcong, Scotts, and other mountains. They extend to and beyond the North River in New York, where they are known as the Highlands, and in Pennsylvania their extension is known as the South Mountain. They cover an area of about 772 square miles in New Jersey, and they contain all the mines of magnetic iron ore.

Gneiss, Granite, Syenite, Mica Schist, &c.

1. **GNEISS**—Central R. R. cut, one mile west of Lebanon, Hunterdon co.
2. ——— Central R. R. cut, one-half mile southeast of High Bridge, Hunterdon co.
3. ——— **Graphitic**—Central R. R. cut, one-half mile southeast of High Bridge, Hunterdon co.

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4. **GRANITE**—High Bridge and Chester R. R., one mile north of High Bridge, Hunterdon co.

5. **GNEISS, with Magnetite**—Whitehall, Hunterdon co.

6. **GNEISS**—One mile west of Mendham on the Chester Road, Morris co.

6A. ——— **with Graphite**—Near Mendham, Morris co.

7. **MICA SCHIST**—Hacklebarney mines, two miles southwest of Chester, Morris co.

*7A. **ROCK**—Hanging wall, Hedges mine, one mile southwest of Chester, Morris co.

*7B. ——— Foot wall, Hedges mine, one mile southwest of Chester, Morris co.

*7C. ——— Pinch between shoots of ore, Hedges mine, one mile southwest of Chester, Morris co.

*8. ——— Foot wall, Dalrymple mine, four miles south of Dover, Morris co.

9. **GNEISS**—Baker mine, Mine Hill, two miles west of Dover, Morris co.

*10. **ROCK**—Foot wall, Randolph Hill mine, one and one-half miles west of Dover, Morris co.

*10A. ——— Hanging wall, Randolph Hill mine, one and one-half miles west of Dover, Morris co.

10B. **GNEISS, Feldspathic**—Horse, Randolph Hill mine, one and one-half miles west of Dover, Morris co.

11. **GNEISS**—D. L. & W. R. R. Co.'s quarry, Dover, Morris co.

*12. **ROCK**—Hanging wall, Allen mine, upper opening, Rockaway tp., Morris co.

*13. ——— Hanging wall, Teabo vein, Mount Hope, Morris co.

*13A. ——— Horse, Teabo vein, Mount Hope, Morris co.

*14. ——— Brannin vein, Hickory Hill, Mount Hope mines, Mount Hope, Morris co.

14A. **GNEISS**—Teabo vein, Mount Hope, Morris co.

15. ——— Foot wall, Glendon Iron Company's shaft, No. 1, Hibernia mines, Morris co.

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15A. **GNEISS**—Horse, Glendon Iron Company's shaft, No. 1, Hibernia mines, Morris co.

16. ——— Foot wall, shaft No. 4, Bethlehem Iron Company, Hibernia mines, Morris co.

*17. **ROCK**—Foot wall, shaft No. 2, Bethlehem Iron Company, Hibernia mines, Morris co.

17A. **GNEISS**—Hanging wall, shaft No. 2, Bethlehem Iron Company, Hibernia mines, Morris co.

18. ——— Shaft No. 7, Bethlehem Iron Company, Hibernia mines, Morris co.

*19. **ROCKS, Suite of**—Beach Glen mine, Rockaway tp., Morris co.

*20. ——— De Camp mine, Rockaway Valley, Morris co.

22. **SYENITE, with Magnetite**—Jackson mine, Pompton, Morris co.

23. **GNEISS**—M. J. Ryerson's quarry, Bloomingdale, Passaic co.

24. ——— Beam Tract, two miles north of Bloomingdale, Passaic co.

25. **SLATE**—Ledge in Pompton river, Pompton, Morris co.

26. **GNEISS**—Near Green Pond iron mines, Copperas mountain, Morris co.

27. **SYENITE**—Jos. Brennan's quarry, on lands of M. J. Ryerson, Charlotteburg, Passaic co.

28. **GNEISS**—Pohatcong mountain, one-half mile south of Riegelsville, Warren co.

*29. **ROCKS, Suite of**—Turkey Hill mines, near Bethlehem, Hunterdon co.

29A. **GNEISS**—Easton and Amboy R. R. cut, one mile west of Bethlehem, Hunterdon co.

30. ——— Wm. S. Gardiner's farm, Pohatcong mountain, two miles north of Bloomsbury, Warren co.

31. ——— Easton and Amboy R. R. cut, one mile west of Bethlehem, Warren co.

32. **SYENITE**—D. L. & W. R.R. cut, one-half mile west of Hampton Junction, Hunterdon co.

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32A. **GRANITE**—Hampton Junction, Hunterdon, co.

33. **GNEISS**—Van Nest Gap tunnel, near Oxford Furnace, Warren co.

34. ——— Aaron Bryan's quarry, Port Murray, Warren co.

35. ——— Bald Pate mine, two miles north of Port Murray, Warren co.

36. ——— Searle mine, two miles southwest of Hackettstown, Warren co.

*37. **ROCKS, Suite of**—Naughtright mine, Naughtrightville, Morris co.

38. **GNEISS**, (*disintegrated*)—Lockwood, Sussex co.

39. **GNEISS**—Herrick's quarry, near Sussex R. R., Byram tp , Sussex co.

40. ——— Sparta turnpike, one mile northwest of Berkshire Valley, Morris co.

41. ——— Summit of Sparta mountain, Sparta turnpike.

42. ——— Hurdtown Apatite mine, Hurdtown, Morris co.

43. ——— Hurd mine, Hurdtown, Morris co.

*44. **ROCK**– Ford mine, Morris co.

*45. ——— Scofield mine, Morris co.

46. **SYENITE**—N. J. Midland R. R. cut, Stockholm, Passaic co.

47. **GNEISS**—One mile south of Vernon, on road to Snufftown, Sussex co.

48. **SYENITE**—One and one-half miles south of Vernon, Sussex co.

49. **GNEISS**—Wawayanda mountain, near Vernon, Sussex co.

50. ——— Green mine, Vernon tp., Sussex co.

51. **SLATE, Talcoid**—Bel. Del. R. R. cut, Marble mountain, Warren co.

52. **GNEISS**—Bel. Del. R. R. cut, one-half mile north of Marble mountain, Warren co.

53. **SYENITE**—Ragged Ridge, Harmony tp., Warren co.

*54. **ROCK**—Roxburg, Warren co.

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55. **GNEISS**—Near Oxford, on Brasscastle road, Warren co.

55A. **GRANITE**—Near Oxford, on Brasscastle road, Warren co.

56. ——— Pequest cut, one and one-quarter miles east of Butzville, Warren co.

57. **ROCK**—Pequest mine, Warren co.

58. **GNEISS**—Jenny Jump mountain, Hope and Danville road, Warren co.

59. **ROCK, Garnet**—Welch lot, west side of Great Meadows, Jenny Jump mountain, Warren co.

60. **ROCK, Talcoid**—Near A. Davis' house, northeast end of Jenny Jump mountain, Warren co.

*61. **ROCKS, Suite of**—Howell farm, Jenny Jump mountain, Warren co.

62. **GNEISS, with Magnetite**—Lesbie shaft, Warrenville, Warren co.

62A. **GNEISS**—Hibler farm, Warrenville, Warren co.

63. ——— Andover mine, Andover, Sussex co.

*64. **ROCKS, Suite of**—Roseville mine, Byram tp., Sussex co.

65. **GNEISS**—House's corner, Sussex co.

66. ——— Quarry near the Fowler mansion, Franklin Furnace, Sussex co.

66A. ——— Furnace vein, Mine Hill, Franklin Furnace, Sussex co.

68. ——— Near Phillip Decker's house, northwest slope of Pochuck mountain, Sussex co.

69. ——— (*disintegrated*)—Trenton, Mercer co.

*70. **GNEISS**—Jersey City, Hudson co.

Crystalline Limestone.

71. **CRYSTALLINE LIMESTONE**—H. C. Sanders' quarry, two miles east of Mendham, Morris co.

71A. ——— H. C. Sanders' quarry, two miles east of Mendham, Morris co.

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72. **CRYSTALLINE LIMESTONE**—J. J. Gordon's quarry, two miles north of Montville, Morris co.

72A. ——— **with Serpentine**—J. J. Gordon's quarry, two miles north of Montville, Morris co.

73. **CRYSTALLINE LIMESTONE**—DeBow's quarry, Wynokie, Passaic co.

73A. ——— **with Serpentine**—DeBow's quarry, Wynokie, Passaic co.

74. **CRYSTALLINE LIMESTONE**—Beam Tract, two miles north of Bloomingdale, Passaic co.

*75. ——— Near Windbeam mountain, Pompton, tp., Passaic co.

*76. ——— Board mine tract, Pompton tp., Passaic co.

77. ——— Marble mountain, Warren co.

77A. ——— **with Gneiss**—Marble mountain, Warren co.

78. **CRYSTALLINE LIMESTONE**—G. H. Cline's quarry, Lower Harmony, Warren co.

79. ——— (Quarry for Steatite), Roxburg, Warren co.

80. ——— Schuler mine, near Roxburg, Warren co.

81. ——— Near Oxford, on road to Brasscastle, Warren co.

82. ——— Phillip Raub's quarry, two miles west of Oxford Furnace, Warren co.

83. ——— E. J. Falkener's quarry, two miles west of Oxford Furnace, Warren co.

84. ——— ("*Rose Crystal Marble,*") Rose Crystal Marble quarry, Hope and Danville road, Jenny Jump mountain, Warren co.

84A. **CRYSTALLINE LIMESTONE**—Rose Crystal Marble quarry, Hope and Danville road, Jenny Jump mountain, Warren co.

85. ——— **with Garnet**—Welch lot, Jenny Jump mountain, west side of Great Meadows, Warren co.

86. **CRYSTALLINE LIMESTONE**—Crane Iron Company's farm, east slope of Jenny Jump mountain, Warren co.

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87. **CRYSTALLINE LIMESTONE**—Musconetcong Iron Works' quarry, Lockwood, Sussex co.

87A. **GNEISS, in Crystalline Limestone**—Musconetcong Iron Works' quarry, Lockwood, Sussex co.

88. **CRYSTALLINE LIMESTONE**—Glendon Iron Company's mine, two miles southwest of Andover, Sussex co.

88A. ——— **Manganiferous**—Glendon Iron Company's mine, two miles southwest of Andover, Sussex co.

89. **CRYSTALLINE LIMESTONE, White**—Boonton Iron Company's quarry, near Andover, Sussex co.

89A. **CRYSTALLINE LIMESTONE, Flesh-colored**—Boonton Iron Company's quarry, near Andover, Sussex co.

90. **CRYSTALLINE LIMESTONE**—M. N. Applegeet's quarry, near Roseville, Sussex co.

91. ——— Near Sussex Lead mine, Pinkneyville, Sussex co.

92. ——— Samuel Woodruff's quarry, Sparta, Sussex co.

92A. ——— **with Chondrodite**–Samuel Woodruff's quarry, Sparta, Sussex co.

93. **CRYSTALLINE LIMESTONE**—Pimple Hill, northwest of Sparta, Sussex co.

94. ——— Homestead Company's quarry, Franklin Furnace, Sussex co.

95. ——— Double rock, Mine Hill, Franklin Furnace, Sussex co.

96. ——— G. W. Rude's quarry, near Hardyston, Sussex co.

97. ——— J. H. Brown's quarry, near Hamburgh, Sussex co.

98. ——— White Rock Lime and Cement Company's quarry, near McAfee Valley, Sussex co.

99. ——— North Vernon, Vernon tp., Sussex co.

100. **SERPENTINE and MAGNESITE**—Hoboken, Hudson co.

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Silurian Formations.

These formations are the lowest and oldest rocks of the geological series which contain fossils. The rocks are sandstones, limestones and slates. These formations occupy many of the valleys between the mountains of Azoic rock and the whole of a belt of country fifteen or twenty miles wide, northwest of and adjoining these mountains. A marked feature of this district is the high, narrow and long ridge which is near its northwestern border, and which is known in New Jersey as the Blue Mountain, in New York as the Shawangunk Mountain, and in Pennsylvania as the Kittatinny Mountain. The divisions of the Silurian are the Potsdam Sandstone, including the Green Pond Mountain Conglomerate, which is the oldest; and then, in order, the Magnesian Limestone, the Trenton Limestone, the Hudson River Slates, the Oneida Conglomerate, the Medina Sandstone, and the Lower Helderberg and associated limestones. The rich farming lands of Sussex and Warren counties are on the Magnesian Limestone, and the grazing and dairying lands are on the Hudson River Slates. The area covered by these formations is about six hundred and fifty square miles.

Potsdam Sandstone.

101. **QUARTZITE**—Near S. A. Leigh's, three miles southwest of Lebanon, Hunterdon co.

102. **SANDSTONE**—Near the South Branch, one mile south of High Bridge, Hunterdon co.

103. ——— Wm. H. Yawger's farm, one mile northeast of Clinton, Hunterdon co.

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104. **SANDSTONE**—D. L. & W. R. R. cut, Changewater, Hunterdon co.

105. ——— D. L. & W. R. R. cut, Washington, Warren co.

106. ——— Near Karrsville, Pohatcong Valley, Warren co.

107. ——— Oxford Furnace, Warren co.

108. ——— D. L. & W. R. R. cut, one-half mile east of Butzville, Warren co.

109. ——— S. T. Scranton's quarry, near Danville, Warren co.

110. ——— Nelson Cummins' quarry, east of Great Meadows, Warren co.

111. ——— Thos. Haggerty's lands, Alamuche, Warren co.

112. ——— Near the Fowler mansion, Franklin Furnace, Sussex co.

113. ——— Near Vernon, Sussex co.

113A. **SLATY ROCK**—Near Vernon, Sussex co.

114. **SANDSTONE**—Mount Paul, Mendham tp., Morris co.

115. **SAND-ROCK**—Boonton Iron Company's sand pit, Flanders, Morris co.

116. **SANDSTONE**—McDougall's quarry, near McCainsville, Morris co.

117. ——— White Rock cut, D. L. & W. R. R., east of Drakesville, Morris co.

118. ——— Murdock's quarry, Green Pond mountain, one-half mile east of Berkshire Valley, Morris co.

119. **SLATY ROCK**—Upper Longwood, west slope of Green Pond mountain, Morris co.

120. ——— West slope of Green Pond mountain, near Woodstock Forge, Morris co.

121. **RED SLATE**—Green Pond mountain, one mile south of Newfoundland, Morris co.

122. **QUARTZOSE CONGLOMERATE**—Ledges near Green Pond mines, Copperas mountain, Morris co.

123. **RED SLATE**—Near Milton, northeast slope of Bowling Green mountain, Morris co.

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124. **GREY SLATY ROCK**—Clinton Falls, Passaic co.

125. **QUARTZOSE CONGLOMERATE**—Ridge east of West Milford, Passaic co.

126. ——— (*Boulder*)—Near Denville, Morris co.

126A. ——— (*Boulder*)—Boonton, Morris co.

Magnesian Limestone.

127. **MAGNESIAN LIMESTONE**—Thomas Adams' quarry, Peapack, Somerset co.

128. ——— Lewis Van Dorn's quarry, Peapack, Somerset co.

129. ——— Daniel Jerolomon's quarry, Peapack, Somerset co.

130. ——— John Philhower's quarry, one mile north of Peapack, Morris co.

131. ——— Moses Craig's quarry, Peapack, Somerset co.

132. ——— Nesbitt's quarry, Roxiticus, Morris co.

133. ——— Fulkerson's quarry, near Annandale, Hunterdon co.

134. ——— J. Mulligan's quarry, Clinton, Hunterdon co.

135. ——— John Cole's quarry, Clinton, Hunterdon co.

136. ——— Quarry on Allerville road, one-half mile south of Annandale, Hunterdon co.

137. ——— Sharp's quarry, three miles southwest of Lebanon, Hunterdon co.

138. ——— S. H. Leigh's quarry, three miles southwest of Lebanon, Hunterdon co.

*139. ——— (*White Limestone in Blue*)—Maurice Sharp's lands, one mile south of High Bridge, Hunterdon co.

*140. **MAGNESIAN LIMESTONE**—Chas. Conover's quarry, three-quarters of a mile south of High Bridge, Hunterdon co.

141. ——— G. W. Van Syckel's quarry, near Little York, Hunterdon co.

141A. ——— **Slaty**—G. W. Van Syckel's quarry, near Little York, Hunterdon co.

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142. **MAGNESIAN LIMESTONE**—Old quarry near the church, Johnson's Ferry, Hunterdon co.

*143. ——— German Valley, Morris co.

144. ——— Gould farm, West Milford, Passaic co.

145. ——— Wm. Cisco's quarry, West Milford, Passaic co.

146. ——— Alexander Smith's quarry, Riegelsville, Hunterdon co.

146A. ——— **Slaty**—Alexander Smith's quarry, Riegelsville, Hunterdon co.

147. **MAGNESIAN LIMESTONE**—J. Hart's quarry, near Bloomsbury, Warren co.

148. ——— Bethlehem tunnel, Easton and Amboy R. R., Hunterdon co.

148A. ——— (*Slaty Rock*)—Easton and Amboy R. R., west end; Bethlehem tunnel, Hunterdon co.

149. ——— Williver's quarry, near Asbury, Hunterdon co.

150. ——— Jas. Riddle's quarry, New Hampton, Warren co.

151. ——— D. L. & W. R. R. cut, Changewater, Hunterdon co.

152. ——— D. L. & W. R. cut, two miles east of Washington, Warren co.

153. ———(*Altered*)—D. L. & W. R. R. cut, one mile west of Changewater, Warren co.

154. ——— J. B. Fisher's quarry, Beattyestown, Warren co.

155. ——— Wm. Vliet's quarry, near Beattyestown, Warren co.

156. ——— Hackettstown Furnace Company's quarry, one mile south of Hackettstown, Warren co.

156A. ——— **with Chert**—Hackettstown Furnace Company's quarry, one mile south of Hackettstown, Warren co.

157. **MAGNESIAN LIMESTONE**—J. Fine's quarry, Carpenterville, Warren co.

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158. **MAGNESIAN LIMESTONE**—Chas. Farney's quarry, Carpenterville, Warren co.

159. ——— Chas. W. Cope's quarry, Carpenterville, Warren co.

160. ——— Gneiss Hill, Phillipsburg, Warren co.

161. ——— P. Kline's quarry, Lower Harmony, Warren co.

162. ——— (*Slaty Rock*)—Thatcher mine, near Stewartsville, Warren co.

163. ——— C. Carhart's quarry, one mile west of Washington, Warren co.

164. ——— Oxford Furnace, Warren co.

165. ——— Page's quarry, three miles northeast of Oxford Furnace, Warren co.

166. ——— Quarry of J. K. & W. Miller, one mile east of Belvidere, Warren co.

167. ——— D. L. & W. R. R. cut, near Bridgeville, Warren co.

168. ——— D. L. & W. R. R. cut, one-half mile east of Butzville, Warren co.

169. ——— J. Park's quarry, Green's Pond, Hope tp., Warren co.

170. ——— Thos. Haggerty's land, Allamuchy, Warren co.

171. ——— On Hope road, near Johnsonburg, Warren co.

172. ——— Musconetcong Iron Works' quarry, near Andover, Sussex co.

173. ——— (*Calciferous Rock*)—Roseville, Sussex co.

174. ——— Quarry near R. R. station, Newton, Sussex co.

175. ——— (*Building Stone*)—Babbitt's quarry, Newton, Sussex co.

176. ——— Ledge near foundry, Lower Lafayette, Sussex co.

177. ——— Wallkill Cement and Lime Co.'s quarries, Hamburgh, Sussex co.

177A. ——— (*Cement Stone*)—Lawrence quarry, Hamburgh, Sussex co.

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178. **MAGNESIAN LIMESTONE**—J. H. Brown's quarry, Hamburgh, Sussex co.

179. ——— Ledge near the Fowler Mansion, Franklin Furnace, Sussex co.

180. ——— Joseph Brennan's quarry, H. Berry's lands, Deckertown, Sussex co.

181. ——— Chandler's Island, Drowned lands, Wantage tp., Sussex co.

182. ——— J. R. Bellis' quarry, Columbia, Warren co.

183. ——— D. Struble's lands, Balesville, Sussex co.

184. ——— Ledge near Branchville, Sussex co.

185. ——— Jesse G. Roe's lands, Branchville, Sussex co.

186. ——— **Metamorphic, with Serpentine**—C. Struble's quarry, Augusta, Sussex co.

Fossiliferous Limestone, Trenton.

187. **FOSSILIFEROUS LIMESTONE**—Upper Longwood, Morris co.

188. ——— Woodstock Forge, Morris co.

189. ——— Van Syckle's place, near Belvidere, Warren co.

190. ——— Hope road, near Johnsonburg, Warren co.

191. ——— Babbitt estate, Newton, Sussex co.

192. ——— Samuel Anderson's lands, 3 miles west of Newton, Sussex co.

193. ——— Jesse G. Roe's land, Branchville, Sussex co.

Hudson River Slate.

194. **SLATE**—Ledge near Old Forge, Upper Longwood, Morris co.

195. ——— (*Weathered*)—D. L. & W. R. R. Cut, near Port Murray, Warren co.

196. ——— Slate quarry near Hackettstown, Warren co.

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197. **SLATE**—Boyer's quarry, Sarepta, Warren co.
198. ——— Bel. Del. R. R. cut, near Manunka Chunk, Warren co.
199. ——— D. L. & W. R. R. cut, Ramseysburg, Warren co.
200. ——— Delaware Water Gap Slate quarry, Delaware Water Gap, Warren co.
201. ——— Ledge on roadside, near Augusta, Sussex co.
202. ——— Anderson's quarry, Newton, Sussex co.
203. ——— Ledge on roadside, Lafayette, Sussex co.
204. ——— M. R. Kays' quarry, Lafayette, Sussex co.
205. ——— (*Indurated*)—Blue mountain, west of Beemersville, Sussex co.
206. ——— (*Massive*)—Flagstone Hill, Wantage tp., Sussex co.
207. ——— Port Jervis turnpike, one mile northwest of Coleville, Sussex co.
208. **LABRADOR ROCK**—Dike; west of Beemersville, Blue mountain, Sussex co.

Oneida Conglomerate.

209. **QUARTZOSE CONGLOMERATE**—Delaware Water Gap, Warren co.
210. **QUARTZITE**—Delaware Water Gap, Warren co.
211. ——— Near Warren Slate Works, Delaware Water Gap, Warren co.
212. **QUARTZOSE CONGLOMERATE**—Culver's Gap, Sussex co.
213. **QUARTZITE**—Culver's Gap, Sussex co.
214. **QUARTZOSE CONGLOMERATE**—High Point, Blue mountain, Sussex co.

Medina Sandstone.

215. **SLATY ROCK**—Near Warren Slate Works, Delaware Water Gap, Warren co.

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215A. **SLATY ROCK**—Near Warren Slate Works, Delaware Water Gap, Warren co.

216. **RED SLATE**—Shoemaker's, near Labar's Island, Pahaquarry, Warren co.

217. **RED SLATY ROCK**—Near Dwaa's Kill, Blue mountain, Sussex co.

218. ——— Sandford Nearpass' lands, Blue mountain, Sussex co.

219. ——— Red Brook, Montague tp., Sussex co.

Water Lime Group.

221. **RIBBON LIMESTONE**—Stoll's quarry, one-half mile south of Wallpack Centre, Sussex co.

222. ——— B. Cole's quarry, two miles south of Wallpack Centre, Sussex co.

223. ——— Fuller's quarry, Pompey Ridge, Wallpack, Sussex co.

Lower Helderberg Limestone.

224. **FIRE-STONE**—Wm. Nearpass' quarry, Montague, Sussex co.

225. **SLATE**—Wm. Nearpass' quarry, Montague, Sussex co.

226. **CORALLINE LIMESTONE**—Wm. Nearpass' quarry, Montague, Sussex co.

227. **PEST STONE**—Wm. Nearpass' quarry, Montague, Sussex co.

228. **OLD QUARRY STONE**—Wm. Nearpass' quarry, Montague, Sussex co.

229. **SLATY ROCK**—Wm. Nearpass' quarry, Montague, Sussex co.

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230. **KNOTTY LIMESTONE**—Wm. Nearpass' quarry, Montague, Sussex co.

231. **QUARRY STONE**—Wm. Nearpass' quarry, Montague, Sussex co.

232. **PENTAMERUS LIMESTONE**—Wm. Nearpass' quarry, Montague, Sussex co.

233. **CHERTY LIMESTONE**—Wm. Nearpass' quarry, Montague, Sussex co.

234. **PENTAMERUS LIMESTONE**—Sandford Nearpass' quarry, Montague tp., Sussex co.

235. **LIMESTONE**—Isaac Bonnell's quarry, Montague tp., Sussex co.

236. **PENTAMERUS LIMESTONE**—J. Schooley's quarry, Peter's Valley, Sussex co.

237. **LIMESTONE**—Wallpack Ridge, west of Flatbrookville, Sussex co.

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Devonian Formations.

These formations have but a very limited exposure in New Jersey, along the Delaware from the New York State line to the Wallpack bend. The area included is about forty square miles, There are some valuable limestones and some good soils, but much of it is encumbered with drift.

Oriskany Sandstone.

241. **SHALE**—Chambers' Mill Brook, Montague tp., Sussex co.
242. ——— One-half mile west of Centreville, Sussex co.
243. ——— One mile south of Wallpack Centre, Sussex co.

Cauda-Galli Grit.

245. **SLATY GRIT**—One mile west of Centreville, Dingman's Ferry road, Sussex co.
*246. **FOSSILS**—Hornbeck's Mills.

Corniferous Limestone.

247. **LIMESTONE**—Carpenter's Point, Sussex co.
248. ——— Delaware river bank, near Mashipacong Island, Montague tp., Sussex co.
249. ——— Milford Bridge, Montague tp., Sussex co.
250. ——— Delaware river bank, Dingman's Ferry, Sandiston tp., Sussex co.

Marcellus Shale.

251. **MARCELLUS SHALE**—Delaware river bank, opposite Mashipacong Island, Montague tp., Sussex co.

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TRIASSIC FORMATIONS.

This formation includes the Red Sandstone of the State. It is characterized by its red color, and its surface is marked by many abrupt mountain ridges of trap rock. It occupies the belt of country next southeast of the Azoic region. It is about 20 miles wide, and extends entirely across from the Hudson to the Delaware. Its area is 1,543 square miles. The rock contains many beds of excellent free stone, which is extensively quarried. The soil, though not rich, is generously responsive to good cultivation, and has been specially noted for the excellent quality of the fruit grown upon it.

253. **SANDSTONE, Feldspathic**—Under trap rock of Palisades, Weehawken, Hudson co.

254. **SANDSTONE**—Under trap rock of Palisades, Weehawken, Hudson co.

255. ——— **Feldspathic**—Trenton, Mercer co.

256. **SANDSTONE**—E. P. Dow's quarry, Pluckamin, Somerset co.

257. ——— Horner's quarry, Pompton Furnace, Passaic co.

257A. **SHALE**—Horner's quarry, Pompton Furnace, Passaic co.

257B. **CONGLOMERATE**—Horner's quarry, Pompton Furnace, Passaic co.

258. **RED SHALE**—Rev. Robert Van Amburgh's lands, Lebanon, Hunterdon co.

259. ——— Manganese mine, near Clinton, Hunterdon co.

260. **FLAGGING STONE**—Smith Clark's quarry, Milford, Hunterdon co.

261 ——— M. McQuire's quarry, Milford, Hunterdon co.

Hosted by Google

262. **RED SHALE**—River bluff, one mile northwest of Milford, Hunterdon co.

263. **QUARTZOSE CONGLOMERATE**—Johnson's Ferry, Hunterdon co.

264. **CALCAREOUS CONGLOMERATE**—Andrew Van Syckle's quarry, three miles northeast of Lebanon, Hunterdon co.

265. ——— Robert Craig's quarry, near New Germantown, Hunterdon co.

266. ——— **containing Gneiss Pebble**—New Germantown, Hunterdon co.

267. **CALCAREOUS CONGLOMERATE**—P. W. Melick's quarry, New Germantown, Hunterdon co.

268. ——— Jas. Ramsey's quarry, New Germantown, Hunterdon co.

269. **LIMESTONE**—Between First and Second mountains, Feltville, Union co.

270. **LIGNITE**—Alyea's quarry, Essex co.

273. **TRAP ROCK**—Bergen Hill, Hudson co.

273A. ——— Bergen Hill, Hudson co.

274. ——— Gap, First mountain, Plainfield, Union co.

275A. ——— Gap, First mountain, Plainfield, Union co.

276. ——— Rocky Hill, Somerset co.

277. ——— Round Valley mountain, Hunterdon co.

278. ——— Silver Hill, New Germantown, Hunterdon co.

279. ——— (*Blue, for Rubble and Paving Blocks*)—Lambertville Quarry Company, Goat Hill, Hunterdon co.

280. ——— (*Grey, for Paving Blocks*)—Lambertville Quarry Company, Goat Hill, Hunterdon co.

282. ——— (*Touchstone*)—Point Pleasant, Hunterdon co.

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Cretaceous Formations.

These formations are characterized by containing extensive and valuable beds of fine clay, and of greensand. The belt of country in which they occur adjoins the Triassic on its northwest border, and extends from the Raritan Bay and the seaside to the Delaware River near Salem. It is near 90 miles long and from 12 to 15 miles wide, and has an area of 1,491 square miles. The white clays occupy the northwestern side of the belt, and the greensand marls the southeastern side.

The clays are extensively used for the commoner kinds of pottery, and fire bricks made from them are among the most infusible known, and they are more used for refractory materials than any other in the country.

The marls have been largely used by farmers, and they have produced most remarkable effects on the soil, restoring fertility to worn out and abandoned fields, and bringing productiveness and thrift to the whole district where they can be used.

290. **FIRE CLAY**—Wm. B. Dixon's pits, Woodbridge, Middlesex co.

290A. ——— **Sandy**—Wm. B. Dixon's pits, Woodbridge, Middlesex co.

291. **RETORT CLAY, Top**—Wm. P. Edgar's pits, Woodbridge, Middlesex co.

291A. **RED SAGGER CLAY**—Wm. P. Edgar's pits, Woodbridge, Middlesex co.

291B. **FIRE CLAY**—Wm. P. Edgar's pits, Woodbridge, Middlesex co.

292. **BLACK CLAY**—Wm. H. Berry's pits, Drummond farm, Woodbridge, Middlesex co.

Hosted by Google

292A. **SAGGER CLAY**—Wm. B. Berry's pits, Drummond farm, Woodbridge, Middlesex co.

292B. **RETORT CLAY**—Wm. H. Berry's pits, Drummond farm, Woodbridge, Middlesex co.

293. **CLAY, with Lignite**—Salamander Works' pits, Woodbridge, Middlesex co.

293A. **ALUM CLAY**—Salamander Works' pits, Woodbridge, Middlesex co.

293B. **FIRE CLAY**—Salamander Works' pits, Woodbridge, Middlesex co.

293C. **RED CLAY**—Salamander Works' pits, Woodbridge, Middlesex co.

294. **SANDY CLAY, Top**—David Ayers' pits, Woodbridge, Middlesex co.

294A. **ALUM CLAY**—David Ayers' pits, Woodbridge, Middlesex co.

294B. **FIRE CLAY**—David Ayers' pits, Woodbridge, Middlesex co.

294C. **RED CLAY**—David Ayers' pits, Woodbridge, Middlesex co.

295. **BLACK CLAY, Top**—Loughridge & Powers' pits, Woodbridge, Middlesex co.

295A. **BLACK PIPE CLAY**—Loughridge & Powers' pits, Woodbridge, Middlesex co.

295B. **TOP CLAY, Sandy**, (*for Pipe*)—Loughridge & Powers' pits, Woodbridge, Middlesex co.

295C. **ALUM CLAY**—Loughridge & Powers' pits, Woodbridge, Middlesex co.

295D. **WARE CLAY**—Loughridge & Powers' pits, Woodbridge, Middlesex co.

295E. **RED SAGGER CLAY**—Loughridge & Powers' pits, Woodbridge, Middlesex co.

295F. **EXTRA SANDY CLAY**—Loughridge & Powers' pits, Woodbridge, Middlesex co.

296. **BLACK CLAY, Top**—A. Hall & Son's pits, Woodbridge, Middlesex co.

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296A. **BLUE AND BUFF CLAY, Top**—A. Hall & Son's pits, Woodbridge, Middlesex co.

296B. **ALUM CLAY**—A. Hall & Son's pits, Woodbridge, Middlesex co.

296C. **FIRE CLAY**—A. Hall & Son's pits, Woodbridge, Middlesex co.

296D. **EXTRA SANDY CLAY**—A. Hall & Son's pits, Woodbridge, Middlesex co.

297. **CLAY,** (*for Stoneware*)—J. R. Watson's bank, Woodbridge, Middlesex co.

297A. ——— (*for Stoneware*)—J. R. Watson's E. pits, Woodbridge, Middlesex co.

297B. **ALUM CLAY**—J. R. Watson's bank, Woodbridge, Middlesex co.

297C. **FIRE CLAY**—J. R. Watson's bank, Woodbridge, Middlesex co.

298. **CLAY**—(*for Stoneware*)—S. A. Meeker & Son's pits, Woodbridge, Middlesex co.

298A. **BLACK PIPE CLAY**—S. A. Meeker & Son's pits, Woodbridge, Middlesex co.

298B. **RETORT CLAY**—S. A. Meeker & Son's pits, Woodbridge, Middlesex co.

298C. **FIRE CLAY**—S. A. Meeker & Son's pits, Woodbridge, Middlesex co.

298D. **SANDY CLAY, Bottom**—S. A. Meeker & Son's pits, Woodbridge, Middlesex co.

298E. **CLAY,** (*for Stoneware*)—S A. Meeker & Son's west pits, Woodbridge, Middlesex co.

298F. ——— **No. 2,** (*for Stoneware*)—S. A. Meeker & Son's west pits, Woodbridge, Middlesex co.

299. **PIPE CLAY**—S. A. Meeker & Son's pits, south of Woodbridge, Middlesex co.

299A. **BLACK PIPE CLAY**—S. A. Meeker & Son's pits, south of Woodbridge, Middlesex co.

300. **WHITE CLAY, Top**—Isaac Flood's pits, Woodbridge, Middlesex co.

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300A. **RETORT CLAY**—Isaac Flood's pits, southwest of Woodbridge, Middlesex co.

301. **BLACK CLAY, Top**—H. Cutter's pits, Woodbridge, Middlesex co.

301A. **SANDY CLAY, Top**—H. Cutter's pits, Woodbridge, Middlesex co.

301B. **FIRE CLAY**—H. Cutter's pits, Woodbridge, Middlesex co.

301C. **WARE CLAY**—H. Cutter's pits, Woodbridge, Middlesex co.

301D. **PAPER CLAY**—H. Cutter's pits, Woodbridge, Middlesex co.

301E. **RED CLAY**—H. Cutter's pits, Woodbridge, Middlesex co.

301F. **EXTRA SANDY CLAY**—H. Cutter's pits, Woodbridge, Middlesex co.

302. **SANDY CLAY, Top**—W. H. P. Benton's pits, Woodbridge, Middlesex co.

302A. **RETORT CLAY**—W. H. P. Benton's pits, Woodbridge, Middlesex co.

302B. **FIRE CLAY**—W. H. P. Benton's pits, Woodbridge, Middlesex co.

302C. **SANDY CLAY, Bottom**—W. H. P. Benton's pits, Woodbridge, Middlesex co.

303. **PIPE CLAY**—Chas. Anness & Son's pits, Woodbridge, Middlesex co.

303A. **FIRE CLAY**—Chas. Anness & Son's pits, Woodbridge, Middlesex co.

304. **TOP CLAY, "Specky,"** (*for Pipe*)—Woodbridge, Clay Co.'s pits, Woodbridge tp., Middlesex co.

304A. **CLAY, "Seamy,"** (*for Pipe*)—Woodbridge Clay Co.'s pits, Woodbridge tp., Middlesex co.

304B. **FIRE CLAY**—Woodbridge Clay Co.'s pits, Woodbridge tp., Middlesex co.

304C. ——— **No. 2**—Woodbridge Clay Co.'s pits, Woodbridge tp., Middlesex co.

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304D. **EXTRA SANDY CLAY**—Woodbridge Clay Co.'s pits, Woodbridge tp., Middlesex co.

305. **BLACK PIPE CLAY**—A. Weber's bank, north bank of Raritan river, Woodbridge tp., Middlesex co.

305A. **BLUE PIPE CLAY**—A. Weber's bank, north bank of Raritan river, Woodbridge tp., Middlesex co.

305B. **TOP CLAY, White,** (*for pipe*)—A. Weber's bank, north bank of Raritan river, Woodbridge tp., Middlesex co.

305C. **FIRE CLAY**—A. Weber's bank, north bank of Raritan river, Woodbridge tp., Middlesex co.

305D. **EXTRA SANDY CLAY**—A. Weber's bank, Woodbridge tp., Middlesex co.

306. **BLUE PIPE CLAY**—East bank of Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

306A. **TOP CLAY, White,** (*for pipe*)—East bank of Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

306B. **FIRE CLAY**—East bank of Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

307. **BLUE PIPE CLAY**—West bank of Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

307A. **BLACK PIPE CLAY**—West bank of Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

307B. **FIRE CLAY**—West bank of Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

308. **WHITE FIRE CLAY**—Southwest pit, Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

309. **BLACK CLAY**—Philip Newkummet's bank, Woodbridge tp., Middlesex co.

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309A. **FIRE CLAY**—Philip Newkummet's bank, Woodbridge tp., Middlesex co.

309B. **CLAY**, (*from bottom*)—Philip Newkummet's bank, Woodbridge tp., Middlesex co.

310. **BLUE FIRE CLAY**—Chas. A. Campbell & Co.'s pits, Woodbridge tp., Middlesex co.

310A. **FIRE CLAY, No. 1**—Chas. A. Campbell & Co.'s pits.

310B. **WHITE FIRE CLAY**—Chas. A. Campbell & Co.'s pits.

310C. **SANDY CLAY**—Chas. A. Campbell & Co.'s pits.

311. **BLACK CLAY**—R. N. & H. Valentine's bank, Raritan tp., Middlesex co.

311A. **WHITE FIRE CLAY**—R. N. & H. Valentine's bank, Raritan tp., Middlesex co.

311B. **FIRE CLAY, No. 1**—R. N. & H. Valentine's bank, Raritan tp., Middlesex co.

312. **CLAY**—David Flood's pits, south of Bonhamtown, Middlesex co.

313. ——— A. M. Freeman's pits, near Bonhamtown, Middlesex co.

314. ——— W. N. Weidener's pits, near Martin's Dock, Piscataway tp., Middlesex co.

315. **KAOLIN, or "Feldspar," No. 1**—W. N. Weidener's pits, Perth Amboy tp., Middlesex co.

[See foot note.]

315A. ——— **No. 2**—. N. Weidener's pits, two miles southwest of Woodbridge, Middlesex co.

315B. **MICACEOUS SAND, or "Kaolin"**—W. N. Weidener's pits, two miles southwest of Woodbridge, Middlesex co.

NOTE.—A strange perversion of the words *Kaolin* and *Feldspar* has become settled among the dealers in clay and other refractory materials about Woodbridge and Amboy, in Middlesex county. The term "Kaolin," is there applied to a very fine white sand, containing a small percentage of clay. The term "Feldspar," is given to a natural material, which consists of coarse, angular grains of quartz, mixed with a large percentage of refractory but not very plastic clay. The term *Micaceous Sand*, may properly be applied to the first of these. And the "Feldspar," after the quartz is washed out, is really Kaolin, or china clay. In deference to the local practice, these common terms have been used in this catalogue, but printed in quotation marks.

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316. **KAOLIN, or "Feldspar"**—Chas. Anness & Son's pits, two miles southwest of Woodbridge, Middlesex co.

316A. **RED CLAY**—Feldspar pits, Chas. Anness & Son, Woodbridge tp., Middlesex co.

316B. **SANDY CLAY**—Feldspar pits, Chas. Anness & Son, Woodbridge tp., Middlesex co.

317. **KAOLIN, or "Feldspar"**—M. Pinner's pits, Perth Amboy, Middlesex co,

318. ——— **No. 1**—Edgar Bros'. pits, Woodbridge tp., Middlesex co.

318A. ——— **No. 2**—Edgar Bros'. pits, Woodbridge tp., Middlesex co.

318B. **CLAY**—Edgar Bros.' Feldspar pits, Woodbridge tp., Middlesex co.

319. **KAOLIN, or "Feldspar"**—B. Valentine's pits, Perth Amboy, Middlesex co.

320. **MICACEOUS SAND, or "Kaolin"**—Merritt's pits, Perth Amboy, Middlesex co.

321. ——— N. Y. & L. B. R. R. cut, Jas. Valentine's lands, Perth Amboy, Middlesex co.

322. ——— Easton & Amboy R. R. cut, Perth Amboy, Middlesex co.

323. ——— David Flood's pits, near Bonhamtown, Middlesex co.

324. ——— R. N. & H. Valentine's pits, Raritan tp., Middlesex co.

325. **KAOLIN, or "Feldspar"**—J. N. Coleman's pits, South Amboy, Middlesex co.

326. **MICACEOUS SAND, or "Kaolin"**—J. K. Brick estate, Burt's Creek, South Amboy, Middlesex co.

327. ——— Whitehead Bros.' pits, South Amboy, tp., Middlesex co.

328. ———Sayre & Fisher's bank, Sayreville, Middlesex co.

329. ——— Whitehead Bros.' bank, Washington, Middlesex co.

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330. **BUFF FIRE CLAY**—E. F. Roberts' pits, north bank of Raritan river, Woodbridge tp., Middlesex co.

330A. **BLUE FIRE CLAY**—E. F. Roberts' pits, north bank of Raritan river, Woodbridge tp., Middlesex co.

330B. **DARK-SPOTTED CLAY**—E. F. Roberts' pits, north bank of Raritan river, Woodbridge tp., Middlesex co.

330C. **LIGHT-SPOTTED CLAY**—E. F. Roberts' pits, north bank of Raritan river, Woodbridge tp., Middlesex co.

330D. **SANDY BLUE CLAY**—E. F. Roberts' pits, north bank of Raritan river, Woodbridge tp., Middlesex co.

331. **RED CLAY**—John DeBow's pits, Woodbridge tp., Middlesex co.

332. **WARE CLAY**—E. F. & J. M. Roberts' pits, Kearny tract, South Amboy Middlesex co.

332A. **PAPER CLAY**—E. F. & J. M. Roberts' pits, Kearny tract, South Amboy, Middlesex co.

332B. **FIRE CLAY**—E. F. & J. M. Roberts' pits, Kearny tract, South Amboy, Middlesex co.

333. **RED CLAY**—George Such's pits, Burt's creek, South Amboy, Middlesex co.

333A. **SPOTTED CLAY**—George Such's pits, Burt's creek, South Amboy, Middlesex co.

333B. **ALUM CLAY**—George Such's pits, Burt's creek, South Amboy, Middlesex co.

333C. **FIRE CLAY**—George Such's pits, Burt's creek, South Amboy, Middlesex co.

333D. **PAPER CLAY**—George Such's pits, Burt's creek, South Amboy, Middlesex co.

333E. ——— (*Yellow*)—George Such's pits, Burt's creek, South Amboy, Middlesex co.

333F. ——— (*Buff*)—George Such's pits, Burt's creek, South Amboy, Middlesex co.

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334. **BLUE FIRE CLAY, No. 1**—J. K. Brick estate, Burt's creek, South Amboy, Middlesex co.

334A. **FIRE CLAY, No. 2**—J. K. Brick estate, Burt's creek, South Amboy, Middlesex co.

334B. **BUFF CLAY**—J. K. Brick estate, Burt's creek, South Amboy, Middlesex co.

334C. **RED CLAY**—J. K. Brick estate, Burt's creek, South Amboy, Middlesex co.

335. **CLAY**, (*for Pottery*)—Western pits; J. K. Brick estate, Burt's creek, South Amboy, Middlesex co.

336. **BLACK PIPE CLAY**—Whitehead Bros'. pits, Sayreville, Middlesex co.

336A. **RED CLAY**—Whitehead Bros'. pits, Sayreville, Middlesex co.

336B. **FIRE CLAY**—Whitehead Bros'. pits, Sayreville, Middlesex co.

336C. **BUFF CLAY**—Whitehead Bros'. pits, Sayreville, Middlesex co.

337. **WHITE FIRE CLAY**—Sayre & Fisher's bank, Sayreville, Middlesex co.

337A. **BLUE FIRE CLAY**—Sayre & Fisher's bank, Sayreville, Middlesex co.

337B. **BURNT CLAY**—Sayre & Fisher's bank, Sayreville, Middlesex co.

338. **CLAY**, (*for Pottery*)—Wm. A. Allen's pits, South Amboy, Middlesex co.

339. **STONEWARE CLAY**—W. C. Perrine's pits, near C. & A. R. R., South Amboy tp., Middlesex co.

339A. **CLAY**, (*bottom of pits*)—W. C. Perrine, near C. & A. R. R., South Amboy tp., Middlesex co.

340. **CLAY**, (*for Yellow Ware*)—E. R. Rose & Son's pits, near C. & A. R. R., South Amboy tp., Middlesex co.

340A. **STONEWARE CLAY**—E. R. Rose & Son's pits, near the C. & A. R. R., South Amboy tp., Middlesex co.

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340B. **CLAY,** (*bottom of pits*)—E. R. Rose & Son's pits, near C. & A. R. R., South Amboy tp., Middlesex co.

341. **SPOTTED CLAY**—Morgan & Stout's bank, South Amboy, Middlesex co.

341A. **STONEWARE CLAY**—Morgan & Stout's bank, South Amboy, Middlesex co.

341B. **SANDY CLAY,** (*bottom of pits*)—Morgan & Stout's bank, South Amboy, Middlesex co.

342. **STONEWARE CLAY**—Theo. Smith's pits, South Amboy tp., Middlesex co.

343. ——— Otto Ernst's mine, Chesquakes, South Amboy tp., Middlesex co.

343A. ——— Surface bed, Otto Ernst, Chesquakes, South Amboy tp., Middlesex co.

345. **CLAY,** (*for Pottery*)—W. C. Perrine's pits, two miles west of South Amboy, Middlesex co.

345. ——— (*for Pottery*)—Everett & Fish's bank, South Amboy, Middlesex co.

346. ——— (*for Pottery*)—Chas. B. Reynold's pits, South Amboy tp., Middlesex co.

347. ——— Bowman & Anderson's pits, near Trenton, Mercer co.

348. ——— Joshua Eayre's pits, Florence, Burlington co.

349. ——— C. Hampshire's pits, Bridgeboro, Burlington co.

350. **RETORT CLAY**—Dr. J. S. Hylton's bank, Pensauken creek, Camden co.

352. **CLAY**—B. A. Lodge's pits, Billingsport, Gloucester co.

353. ——— (*washed*)—S. B. Shimer's mine, Bethlehem, Hunterdon co.

Greensand Marl Beds.

375. **CLAY MARL**—E. Hardy's pits, Matavan, Middlesex co.

376. ——— Mulford & Pine, brick clay pits, Kinkora, Burlington co.

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377. **CLAY MARL**—John E. Hopkins' pits, Haddonfield, Camden co.

378. ——— Samuel Sharp's pits, Woodbury, Gloucester co.

LOWER MARL BED.

379. **RED, or HIGH BANK MARL**—I. G. Smock's pits, Holmdel, Monmouth co.

379A. **GREY MARL**—I. G. Smock's pits, Holmdel, Monmouth co.

380. **SHELL MARL**—Rev. G. C. Schanck's pits, Marlborough, Monmouth co.

380A. **SAND MARL**—Rev. G. C. Schanck's pits, Marlborough, Monmouth co.

381. **SHELL MARL**—O. C. Herbert's pits, Marlborough, Monmouth co.

382. **BLUE MARL**—John R. Perrine's pits, Manalapan, Monmouth co.

383. **SHELL MARL**—Nathan Lippincott's pits, Auburn, Salem co.

384. **GREEN EARTH**, (*Indurated*)—Big Hill, Holmdel tp., Monmouth co.

This Green Earth lies just below the Middle Marl Bed.

385. **GREEN-LAND**—Blackwoodtown, Camden co.

Underlying the Middle Marl Bed.

386. "**UPPER MARL**"—B. Lodge's pits, Mantua, Gloucester co.

386A. "**LOWER MARL**"—B. Lodge's pits, Mantua, Gloucester co.

386B. "**SHELL LAYER**"—B. Lodge's pits, Mantua, Gloucester co.

These "Marls" of Lodge's pits belong to the Red Sand Bed, of the Marl Series.

387. **RED SAND**—Mullica Hill, Gloucester co.

388. ——— Auburn, Salem co.

387 and 388 represent the Red Sand Bed, which lies between the Lower Marl Bed and the Middle Marl Bed.

MIDDLE MARL BED.

390. **LIMESAND**—Turtle Mill, near Long Branch, Monmouth co.

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391. **YELLOW MARL**—Eatontown, Monmouth co.

392. **GREEN MARL**—Blue Ball, Monmouth co.

393. ——— Cream Ridge Marl Co.'s pits, Upper Freehold, Monmouth co.

394. **CHOCOLATE MARL**—Pemberton Marl Co.'s pits, Birmingham, Burlington co.

394A. **GREEN MARL**—Pemberton Marl Co.'s pits, Birmingham, Burlington co.

395. **TEREDO TIBILLIS**, (*Marl*)—Haines' Mill, near Medford, Burlington co.

396. **LIMESAND**—H. I. Irick's pits, Vincentown, Burlington co.

This layer contains much calcareous material; hence its name.

397. **GREEN MARL**—N. T. Stratton's pits, Mullica Hill, Gloucester co.

397A. **SHELL MARL**—N. T. Stratton's pits, Mullica Hill, Gloucester co.

397B. **LIMESAND**—N. T. Stratton's pits, Mullica Hill, Gloucester co.

398. **YELLOW LIMESTONE**—Barber's quarry, Mannington tp., Salem co.

In this the calcareous material is sufficiently large to admit of its use for making lime.

399. **GREEN MARL**—I. V. Dickinson & Bro.'s pits, Woodstown, Salem co.

400. **FULLER'S EARTH**—Squankum Marl Co.'s pits, near Farmingdale, Monmouth co.

This lies just below the Upper Marl Bed.

UPPER MARL BED.

401. **GREEN MARL**—Squankum Marl Co.'s pits, near Farmingdale, Monmouth co.

401A. **ASH MARL**—Squankum Marl Co.'s pits, near Farmingdale, Monmouth co.

402. **GREEN MARL**—Vincentown, Burlington co.

403. ——— H. Adams' pits, Clementon, Camden co.

NOTE.—For additional specimens of the Greensand Marls and other natural fertilizers of the State, see Exhibit of the State of New Jersey, in Agricultural Hall; location E, 17 and 18.

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TERTIARY FORMATIONS.

The southern portion of the State is mainly occupied by these formations. They consist of beds of sand and clay, and the surface is covered with a thin soil, which is not naturally very productive. Some of the clays contain shells enough to be designated as marls; and extensive beds of the purest of white sand, for glass-makers' use, are common. Some good farms are found on this formation, and along its borders are found some of the best farms in the State.

The drift materials are scattered very unevenly over the different formations throughout the State.

Eocene.

404. **BLUE MARL**—Abner Allens' pits, Deal, Monmouth co.

This is the upper layer of the Upper (Greensand) Marl Bed; but its fossils show it to be Eocene Tertiary.

Miocene.

415. **YELLOW MARL**—G. Ayars' pits, near Jericho, Cumberland co.

415A. **GREEN MARL**—G. Ayars' pits, near Jericho, Cumberland co.

415B. **SHELL MARL**—G. Ayars' pits, near Jericho, Cumberland co.

Drift.

416. **DRIFT GRAVEL**—West Jersey R. R. cut, Vineland, Cumberland co.

416A. **DRIFT SAND**—Woodmansie, Burlington co.

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RECENT FORMATIONS.

417. **FOSSIL OYSTER SHELLS** — Maurice River bank, near Port Elizabeth, Cumberland co.

418. **SHELLS**—Shell heap, Flax Island, near Tuckerton, Burlington co.

419. **INFUSORIAL EARTH**—Cook farm, near Drakesville, Morris co.

419A. ——— Cook farm, near Drakesville, Morris co.
Burned and pressed.

420. **SHELL MARL**—Isaac Bonnell's farm, Montague, Sussex co.

421. ——— Williamsville, Vernon tp., Sussex co.

422. **CALCAREOUS SINTER**—Dingman's Ferry, Vernon tp., Sussex co.

423. **BEACH PEBBLES**—Sea Grove, Cape May co.

424. **BEACH SAND**—Sea Grove, Cape May co.

425. ——— Old Beach, Atlantic City, Atlantic co.

426. ——— New Beach, Atlantic City, Atlantic co.

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MINERALS.

501. **Zincite, Tephroite and Calcite**—Franklin Furnace, Sussex co.

503. **Willemite, Garnet and Franklinite**—Franklin Furnace, Sussex co.
Willemite of rare quality.

504. **Willemite and Garnet**—Franklin Furnace, Sussex co.
Willemite of rare quality.

504A. **Willemite**—Franklin Furnace, Sussex co.
Of rare quality.

505. **Calamine**—Stirling Hill, Sussex co.
Five specimens, two of which are in the top of case.

506. **Sussexite and Zincite in Calcite**—Franklin Furnace, Sussex co.

507. **Fowlerite in Calcite**—Franklin Furnace, Sussex co.
Three specimens.

508. **Fowlerite and Franklinite in Calcite**—Franklin Furnace, Sussex co.

509. **Zincite, Willemite and Franklinite**—Franklin Furnace, Sussex co.

510. **Pyrrhotite**—Newton, Sussex co.

511. **Fowlerite, Garnet, Willemite, Calcite and Franklinite**—Franklin Furnace, Sussex co.

512. **Willemite, Zincite and Franklinite**—Franklin Furnace, Sussex co.

513. **Smithsonite, Willemite and Franklinite**—Franklin Furnace, Sussex co.

514. **Franklinite and Willemite**—Franklin Furnace, Sussex co.

515. **Calcophanite**—Stirling Hill, Sussex co.

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516. **Zincite and Willemite**—Franklin Furnace, Sussex co.
Two specimens.

517. **Zincite**—Stirling Hill, Sussex co.
Three specimens, two of which are of rare quality.

517A. **Zincite and Calcite**—Stirling Hill, Sussex co.

518. **Garnet**—Stirling Hill, Sussex co.
One of the largest crystals of Garnet ever found. It is loaned to this collection by the Passaic Zinc Co.

519. **Asbestos**—Roseville, Sussex co.
Three specimens.

520. **Roepperite**—Stirling Hill, Sussex co.

521. **Amphibole**—Stirling Hill, Sussex co.

522. **Dysluite and Jeffersonite**—Stirling Hill, Sussex co.

522A. **Jeffersonite**—Stirling Hill, Sussex co.

523. **Sapphire**—Newton, Sussex co.
Specimens 520, 521, 522, 522A and 523 are loaned by Fred'k A. Canfield, M. E., of Dover.

524. **Barite**—Newton, Sussex co.

525. **Franklinite, Willemite and Zincite**—Stirling Hill, Sussex co.
Two specimens.

527. **Serpentine and Chrysolite**—Wynokie, Passaic co.
Two specimens.

528. **Graphite**—Pinkneyville, Sussex co.

529. **Serpentine**—Montville, Morris co.
Five specimens, two of which are composed chiefly of Marmolite.

530. **Calcite**—Bergen Hill, Hudson co.
Twelve specimens.

531. **Calcite and Pyrite**—Bergen Hill, Hudson co.
Three specimens.

532. **Pectolite**—Bergen Hill, Hudson co.
Nine specimens.

533. **Datolite**—Bergen Hill, Hudson co.
Six specimens.

535. **White Quartz**—Bergen Hill, Hudson co.

536. **Datolite and Natrolite**—Bergen Hill, Hudson co.
Three specimens.

537. **Apophyllite**—Bergen Hill, Hudson co.
Two specimens.

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539. **Analcite and Datolite**—Bergen Hill, Hudson co.
Two specimens.

540. **Analcite, Datolite and Apophyllite** — Bergen Hill, Hudson co.

541. **Apophyllite and Calcite**—Bergen Hill, Hudson co.
Two specimens.

542. **Natrolite and Prehnite**—Bergen Hill, Hudson co.

543. **Prehnite and Pectolite**—Bergen Hill, Hudson co.

544. **Natrolite**—Bergen Hill, Hudson co.
Two specimens.

545. **Stilbite**—Bergen Hill, Hudson co.

546. **Asbestos**—Hoboken, Hudson co.

548. **Magnesite and Serpentine**—Hoboken, Hudson co.
Two specimens.

549. **Prehnite and Calcite**—Bergen Hill, Hudson co,

550. **Native Copper and Cuprite**—New Brunswick, Middlesex co.
Two specimens.

551. **Malachite**—New Brunswick, Middlesex co.
Two specimens.

552. **Vivianite**—Shrewsbury, Monmouth co.
Twenty-three specimens.

553A. **Mullicite and Vivianite**—Mullica Hill, Gloucester co.

554. **Belemnite replaced by Vivianite**—Mullica Hill, Gloucester co.
Nine specimens.

564. **Willemite,** (*Troostite*)—Stirling Hill, Sussex co.

565. **Barite and Calcite**—New Brunswick, Middlesex co.

566. **Mullicite**—Mullica Hill, Gloucester co.
Four specimens.

567. **Fowlerite, Willemite and Franklinite**—Franklin Furnace, Sussex co.
Polished block.

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703. **Magnetite,** (*Lodestone*)—Dickerson mine, Morris co.
Loaned by F. A. Canfield, M. E., of Dover.

954. **Mica**—Broadway, Warren co.
One large section of a Crystal, in top of the case. The small pieces, in flat case, are found in the bent condition.

In this collection the specimens numbered 501, 504, 506, 507, 508, 509, 511, 513, 516, 517, 522, 525, 551, 552, 564, 565, 567 and 954 are from the Cabinet of Rutgers College, New Brunswick, N. J.

Nos. 520, 521, 522, 522A, 523 and 703 are from the unique and magnificent Canfield collection at Ferromont, near Dover, Morris co., and they are loaned by Fred'k A. Canfield, M. E.

The rare and beautiful Minerals from Bergen Hill, Hudson co., were collected by Joseph F. Talson, of Jersey City Heights, and sold by him to the State.

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BUILDING MATERIALS.

Building Stone.

600. **GNEISS**—Wm. Sykes' quarry, one mile east of Franklin Furnace, Sussex co.

601. **"GRANITE"**—Jos. Brennan's quarry, on lands of M. J. Ryerson, Charlotteburg, Passaic co.

This is properly a Syenite, and it appears as such in the list of rocks of the Azoic Formations, No. 27.

602. **GNEISS**—M. J. Ryerson's quarry for paving blocks, Bloomingdale, Passaic co.

Also, in Azoic Rocks, No. 23.

603. ——— Beam tract, two miles north of Bloomingdale, Passaic co.

604. ——— Herrick's quarry, on line of Sussex R. R., Byram tp., Sussex co.

Also as 39 of this Catalogue.

605. ——— Aaron Bryan's quarry, near Port Murray, Warren co.

Duplicate, No. 34, of this Catalogue.

606. ——— D. L. and W. R. R. Co.'s quarry, Dover, Morris co.

607. **MARBLE**—Marble Mountain quarry, near Bel. Del. R. R., Warren co.

Duplicate, No. 77, of this Catalogue.

609. ——— M. N. Appleget's quarry, near Roseville, Sussex co.

Duplicate, No. 90, of this Catalogue.

608. ——— (*"Rose Crystal"*)—Jenny Jump Mountain, two miles west of Danville, on road to Hope, Warren co.

Duplicate specimen, No. 84, of this Catalogue.

610. ——— G. W. Rude's quarry, near Hardystonville, Sussex co.

Also in this collection No. 96.

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611. **SANDSTONE**—S. T. Scranton's quarry, Danville, Warren co.

612. ——— Karrsville, Pohatcong Valley, Warren co.

613. **LIMESTONE**—Col. Babbitt estate, Newton, Sussex co.
Also as No. 175 of this collection.

614. ——— (*"Blue Stone"*)—Jos. Brennan's quarry, on lands of H. Berry, near Deckertown, Sussex co.

615. **SANDSTONE**—Quarry of the United Railroads of New Jersey Co., Prallsville, Hunterdon co.
Four blocks. Donor, Ashbel Welch, Esq., Lambertville.

616. ——— Keeler, Skirm & Co.'s quarry, Greensburg, Mercer co.

617. **"BROWN STONE"**—Belleville, Essex co.
Donor, J. J. Spurr, of Newark.

618. ——— Bloomfield Road quarry, Essex co.
Donor, J. J. Spurr, Newark.

619. **SANDSTONE,** (*Drab-Colored*)—Martinville, Somerset co.

620. ——— (*Drab-Colored*) — Wallace Vail's quarry, two miles north of Plainfield, Somerset co.

Roofing Slate.

625. **ROOFING SLATE**—M. R. Kay's quarry, near Lafayette, Sussex co.; —— Williams, lessee.
Duplicate in Geological Series, No. 204.

626. ——— Anderson's quarry, Newton, Sussex co.
Duplicate in Geological Series 202.

627. ——— Boyer's quarry, Sarapta, three miles northeast of Belvidere, Warren co.

628. ——— Delaware Water Gap quarry, Howe & Evans, Delaware Water Gap, Warren co.
Duplicate in Geological Series, No. 200.

These specimens of roofing slate represent all the quarries which have been worked during the past year. There are a few other small quarries, where a small amount of slate has been obtained.

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Flagging Stone and Paving Stone.

Specimens of the rocks used for flagging are included in the rocks of the Geological Series, as follows : Nos. 200 and 206 of the Hudson River Slate, and 260 and 261 of the Triassic Period; and those for paving as No. 23 of the Gneissic, and Nos. 273, 279 and 280 of the Trappean rocks.

Lime and Cement.

631. **LIME**—White Rock Lime and Cement Co., McAfee Valley, Sussex co.

This Lime is made from white crystalline limestone, and is almost entirely free from magnesia.

632. ——— Wallkill Cement and Lime Co., Hamburgh, Sussex co.

Made from blue magnesian limestone.

632A. **CEMENT**—Wallkill Cement and Lime Co., Hamburgh, Sussex co.

633. **LIME**—Chas. W. Cope's kilns, Carpenterville, Warren co.

Made from blue magnesian limestone. This specimen may be considered as representative of most of the lime burned in the state—using the common blue limestone, in which the lime and magnesia stand in the same ratio as in dolomite.

634. ——— Sandford Nearpass' kilns, Montague tp., Carpenter's Point, Sussex co.

Made from the blue limestone of the LOWER HELDERBERG EPOCH. It is not magnesian.

635. ——— Barber's kilns, Mannington tp., Salem co.

Made from the yellow limestone of the MIDDLE MARL BED.

636. ——— Outcalt & DeHart, New Brunswick.

Made from oyster shells.

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MAGNETIC IRON ORES.

These ores are all in the Azoic Formations, and occur in beds, interposed conformably between the layers of the Gneiss rocks. They sometimes extend for a considerable distance, but they are not continuous like the rocks themselves; thinning out to nothing at their edges, and in many cases descending beneath the surface in long folds or rolls, to an unknown depth. The mines have long been worked, and most of the ore is carried to furnaces near the coal mines in Pennsylvania. There are sixteen blast furnaces in the state, all of which are largely run upon this ore.

The mines now opened number nearly 200, and are capable of supplying 1,000,000 tons of ore annually. The ores are rich, and being near the great markets of the country, they find a ready sale. They vary in purity, some containing a little phosphorus, others sulphur, while others are almost entirely free from these impurities. Many of the ores in the north-west, or Pequest Belt, contain oxide of manganese, and are in demand for making Bessemer steel.

The manufacture of iron was begun by Lewis Morris, in Monmouth co., as early as 1682. Forges for working the magnetic ore of Morris co. into bar iron, were built at Whippany about 1710. The blast furnace at Oxford, was built in 1742; and iron has been a staple product of New Jersey from those early days. The annual product, however, has been subject to great variations, with the business of the country, the improvement in methods of manufacture, and the convenience of locations for cheap transportation, abundant supplies, and ready markets.

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The specimens in the collection fairly represent the mines of the state,—though it has not been possible, at this time, to get good samples of ore from all of them.

[Those marked thus * are not on exhibition, owing to want of space].

Mines of the Ramapo Belt.

*640. **IRON ORE**—Bernardsville, Somerset co.

*641. ——— Janes' mine, Somerset co.

642. ——— Connet mine, Water street, Mendham tp., Morris co.

*643. ——— Taylor mine, Montville tp., Morris co.

*644. ——— Cole farm, Montville tp., Morris co.

*645. ——— Kahart mine, Pequannock tp., Morris co.

*646. ——— Lanagan mine, Pequannock tp., Morris co.

*647. ——— De Bow mine, Pequannock tp., Morris co.

648. ——— Jackson, or Pompton mine, near Pompton, Morris co.

*649. ——— Ryerson's De Bow mine, near Pompton, Morris co.

*650. ——— Beam tract, two miles north of Bloomingdale, Passaic co.

651. ——— Brown mine, Wynokie, Passaic co.

652. ——— Kanouse mine, Wynokie, Passaic co.

*653. ——— Butler mine, Ramapo mt., Passaic co.

Mines of the Passaic Belt.

654. **IRON ORE**—Large's mine, High Bridge, Hunterdon co.

654A. ——— Large's mine, High Bridge, Hunterdon co.

655. ——— High Bridge mines, High Bridge, Hunterdon co.

655A. ——— High Bridge mines, High Bridge, Hunterdon co.

This old and well-known mine is now worked by the Thomas Iron Co. The ore is sent to Hokendauqua, Pa.

*656. ——— Old Furnace mine, Hunterdon co.

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*657. **IRON ORE**—Cokesburgh mine, Hunterdon co.

*658. ——— Fox Hill mine, Hunterdon co.

*659. ——— Pottersville openings, Hunterdon co.

*660. ——— Bartles' openings, near Pottersville, Hunterdon co.

*661. ——— Pottersville mine, (northeast,) Chester tp., Morris co.

*662. ——— Rarick Farm mine, Chester tp., Morris co.

*663. ——— Pitney Farm mine, Chester tp., Morris co.

*664. ——— Hardin Farm mine, Chester tp., Morris co.

*665. ——— Budd & Woodhull mines, Chester tp., Morris co.

*666. ——— Topping Farm mine, Chester tp., Morris co.

667. ——— Samson or Skellenger mine, Chester, Morris co.

*668. ——— Chester hotel property mine, Chester, Morris co.

*669. ——— Collis Farm mine, Chester, Morris co.

*670. ——— Creamer Farm mine, Chester, Morris co.

*671. ——— Swayze mine, Chester, Morris co.

672. ——— Open cut, east of Black river, Hacklebarney mine, two miles southwest of Chester, Morris co.

672A. ——— Coal-house cut or opening, Hacklebarney mine, two miles southwest of Chester, Morris co.

Large block of ore under the case, Chester Iron Co.

672B. ——— Coal-house vein on hill, Hacklebarney mine, two miles southwest of Chester, Morris co.

672C. ——— Coal-house vein on hill, Hacklebarney mine, two miles southwest of Chester, Morris co.

672D. ——— Open cut, foot-wall vein on hill, Hacklebarney mine, two miles southwest of Chester, Morris co.

These represent the extensive open workings of this old *mine*, now owned and worked by the Chester Iron Co.

*673. ——— Gulick mine, near Chester, Morris co.

*674. ——— Creager mine, near Chester, Morris co.

675. ——— Hedges mine, 1 mile S. W. of Chester, Morris co.

A large vein opened a few years ago, and now worked by the North Jersey Iron Co. This ore, like most of the ore found about Chester, contains some sulphur—in the form of iron pyrite. Roast-

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ing in the Taylor Calcining kiln, removes nearly all this element, leaving a rich ore which is sufficiently free from phosphorus to be used for Bessemer pig.

*676. **IRON ORE**—Dickerson Farm mine, Chester, Morris co.

*677. ——— Creamer Farm mine, Chester, Morris co.

*678. ——— De Camp mine, Chester, Morris co.

*679. ——— Leake mine, Chester, Morris co.

*680. ——— Daniel Horton mine, Chester, Morris co.

*681. ——— Barnes mine, Chester, Morris co.

*682. ——— David Horton mine, Randolph tp., Morris co.

*683. ——— De Hart mine, Randolph tp., Morris co.

684. ——— Carbon or Dalrymple mine, west stopes 265 ft. deep, four miles south of Dover, Morris co.

684A. ——— Carbon or Dalrymple mine, middle stopes 240 ft. deep, four miles south of Dover, Morris co.

684B. ——— Carbon or Dalrymple mine, northeast stopes 140 ft. deep, four miles south of Dover, Morris co.

This ore is mined for the Carbon Iron Co., Parryville, Pa.

*685. ——— Trowbridge farm, Randolph tp., Morris co.

*686. ——— Lewis or Herrick mine, Randolph tp., Morris co.

*687. ——— Combs mine, Randolph tp., Morris co.

*688. ——— Cooper mine, Randolph tp., Morris co.

*689. ——— Sol. Dalrymple mine, Randolph tp., Morris co.

*690. ——— Canfield mine, Ferromont, three miles west of Dover, Morris co.

690A. ——— Canfield mine, Ferromont, three miles west of Dover, Morris co.

690B. ——— Canfield mine, Ferromont, three miles west of Dover, Morris co.

This mine is owned by the Dickerson, Suckasunny Mining Co., and is worked by E. Canfield, for the Port Oram furnace. This furnace has a stack sixty feet high, with boshes sixteen feet diameter.

691. ——— Canfield phosphatic iron mine, Ferromont, Morris co.

This ore, remarkable for its large per centage of granular apatite, occurs in a vein eight feet wide, on the property of the above mentioned company.

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*692. **IRON ORE**—J. D. King mine, Randolph tp., Morris co.

*693. ——— Henderson mine, Randolph tp., Morris co.

*694. ——— Bryant mine, Randolph tp., Morris co.

*695. ——— Connor Foulan mine, Randolph tp., Morris co.

*696. ——— Charles King mine, Randolph tp., Morris co.

*697. ——— King mine, Randolph tp., Morris co.

*698. ——— McFarland mine, Randolph tp., Morris co.

699. ——— Evers mine, three miles southwest of Dover, Morris co.

700. ——— Brotherton mine, three miles southwest of Dover, Morris co.

700A. ——— Brotherton mine, three miles southwest of Dover, Morris co.

Surface ore.

*701. ——— Erb mine, Randolph tp., Morris co.

*702. ——— Scrub Oak mine, Randolph tp., Morris co.

703. ——— Dickerson mine, Ferromont, three miles west of Dover, Morris co.

Coarse—granular, or "shot ore." Hanging-wall side of vein, Big mine.

This is one of the oldest and most noted of the magnetic iron ore mines of New Jersey, and it has steadily furnished a large amount of very rich ore. It is the deepest in the state. At present it is owned by the Dickerson Suckasunny Mining Co., and is worked by the Allentown Iron Co. Most of the ore is smelted at their furnaces, Allentown, Pa. The large block in the aisle, between the cases, is from this mine—the gift of the owners and lessees. It weighs about 1800 lbs. In the case of minerals, there is a large and remarkably strong, natural magnet (lodestone) from this mine. It is loaned to this collection by Fred. A. Canfield, M. E., of Dover.

703A. ——— **Slickensides (?) with red oxide of iron**—Foot-wall side of vein, Dickerson mine, Ferromont, three miles west of Dover, Morris co.

704. **IRON ORE**—Byram mine, Mine Hill, two miles west of Dover, Morris co.

This specimen contains some granular apatite.

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704A. **IRON ORE**—Byram (Russell) mine, Mine Hill, two miles west of Dover, Morris co.

704B. ——— (**with apatite**)—Byram (Russell) mine, Mine Hill, two miles west of Dover, Morris co.

704C. **IRON ORE**—First, or hanging-wall vein, Byram mine, Mine Hill, two miles west of Dover, Morris co.

*704D. ——— Third vein or Hard vein, Byram mine, Mine Hill, two miles west of Dover, Morris co.

*704E. ——— Fourth vein, Byram mine, Mine Hill, two miles west of Dover, Morris co.

*704F. ——— Fourth vein, Byram mine, Mine Hill, two miles west of Dover, Morris co.

This mine is one of the deepest in the iron district, the slope being over seven hundred feet in length. The Andover Iron Co. work it in their furnaces at Phillipsburg, Warren county.

[See foot note.]

705. ——— Baker mine, Pennsylvania and New Jersey Mining Co., Mine Hill, two miles west of Dover, Morris co.

705A. ——— Shaft No. 1, Baker mine, Pennsylvania and New Jersey Mining Co., Mine Hill, two miles west of Dover, Morris co.

705B. ——— Shaft No. 6, Baker mine, Pennsylvania and New Jersey Mining Co., Mine Hill, two miles west of Dover, Morris co.

705C. ——— Shaft No. 4, Baker mine, Pennsylvania and New Jersey Mining Co., Mine Hill, two miles west of Dover, Morris co.

705D. ——— Shaft No. 1, Baker mine, Pennsylvania and New Jersey Mining Co., Mine Hill, two miles west of Dover, Morris co.

This specimen remarkable for the large amount of apatite, resembling the Canfield phosphatic iron ore.

*706. ——— Millen mine, Mine Hill, two miles west of Dover, Morris co.

NOTE.—This Company has three furnaces, whose stacks are fifty-five and forty-two feet high, with eighteen feet boshes. J. C. Kent, Manager.

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707. **IRON ORE**—East drift, main vein, Randolph Hill mine, one-and-a-half miles west of Dover, Morris co.

707A. ——— Sink, main vein, Randolph Hill mine, one-and-a-half miles west of Dover, Morris co.

707B. ——— Hanging-wall vein, Randolph Hill mine, one-and-a-half miles west of Dover, Morris co.

This mine is worked by the Crane Iron Co.; furnaces at Catasauqua, Pa.

708. ——— Jackson Hill mine, one-and-a-half miles west of Dover, Morris co.

Surface ore.

708.A ——— Jackson Hill mine, one-and-a-half miles west of Dover, Morris co.

709. ——— Sterling mine, Irondale, two miles west of Dover, Morris co.

709A. ——— Sterling mine, Irondale, two miles west of Dover, Morris co.

709B. ——— Sterling mine, Irondale, two miles west of Dover, Morris co.

709C. ——— Sterling mine, Irondale, two miles west of Dover, Morris co.

709D. ——— North River mine, Irondale, two miles west of Dover, Morris co.

709E. ——— North River mine, Irondale, two miles west of Dover, Morris co.

*709F. ——— Orchard mine, Port Oram, Morris co.

The Irondale mines are owned by Conrad Poppenhusen, New York, and are worked under leases.

*710. ——— Washington Forge mine, Rockaway tp., Morris co.

711. ——— East, or Big mine, Mount Pleasant mine, Mount Pleasant, Morris co.

711A. ——— West stopes of West mine, Mount Pleasant mine, Mount Pleasant, Morris co.

The Mount Pleasant mine is worked by the Boonton Iron Co. This mine is of interest to the geologist, because of its numerous short faults or "offsets," which displace the *vein*, or ore-bed.

[See foot note.]

NOTE.—This Company has two furnaces at Boonton, Morris county. Height of stacks, forty-four and sixty feet; diameter of boshes, thirteen-and-a-half and sixteen feet, with large rolling mill and nail works.

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712. **IRON ORE**—Southeast vein, Baker mine, Mount Pleasant, Morris co.

712A. ——— Northwest vein, Baker mine, Mount Pleasant, Morris co.

This mine has been worked vigorously for several years by the Allentown Iron Company. A map and sections above the case of iron ores, shows the structure and size of the veins.

713. ——— Northeast stopes, southeast vein, Richards mine, Mount Pleasant, Morris co.

713A. ——— Southwest stopes, southeast vein, Richards mine, Mount Pleasant, Morris co.

713B. ——— Northwest vein, Richards mine, Mount Pleasant, Morris co.

This mine is worked by the Thomas Iron Company.

714. ——— Stopes below the tunnel, Allen mine, Rockaway tp., Morris co.

714A. ——— Stopes below the tunnel, Allen mine, Rockaway tp., Morris co.

714B. ——— Southwest opening on hill, Allen mine, Rockaway tp., Morris co.

The ore of this mine is sent to the Andover Iron Company's furnaces at Phillipsburg.

715. ——— Shaft No. 3, Teabo mine, Rockaway tp., Morris co.

715A. ——— Shaft No, 2, Teabo mine, Rockaway tp., Morris co.

This mine is worked for the Glendon Iron Company; furnaces at Glendon, Pa.

716. ——— Taylor, or Big vein, Mount Hope mines, Mount Hope, Morris co.

716A. ——— Teabo vein, Mount Hope mines, Mount Hope, Morris co.

716B. ——— Brannin vein, Mount Hope mines, Mount Hope, Morris co.

716C. ——— Brannin vein, Mount Hope mines, Hickory Hill, Morris co.

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716D. **IRON ORE**—Teabo vein, Mount Hope mines, Hickory Hill, Morris co.

The Lackawanna Iron and Coal Company own and work these mines. The workings are very extensive, and the product of the several veins as here opened has amounted to nearly 100,000 tons of ore in one year. The ore goes to Scranton, Pa.

*717. ——— Johnson Hill mines, near Port Oram, Morris co.

*718. ——— Huff mine, near Port Oram, Morris co.

718A. ——— Huff mine, near Port Oram, Morris co.

718B. ——— Huff mine, near Port Oram, Morris co.

A considerable amount of ore has been raised from this mine in the past few years, for the Port Oram furnace.

*719. ——— Dolan mine, near Mount Pleasant, Morris co.

720. ——— Swedes mine, one mile east of Dover, Morris co.

720A. ——— Swedes mine, one mile east of Dover, Morris co.

The Boonton Iron Company work this mine.

*721. ——— Sigler mine, Rockaway tp., Morris co.

*722. ——— White Meadow mine, Rockaway tp., Morris co.

723. ——— Andover Iron Co., Hibernia mines, Rockaway tp., Morris co.

723A. ——— Andover Iron Co., Hibernia mines, Rockaway tp., Morris co.

723B. ——— Andover Iron Co., Hibernia mines, Rockaway tp., Morris co.

723C. ——— Andover Iron Co., Hibernia mines, Rockaway tp., Morris co.

723D. ——— Glendon shaft, 325 feet deep, Glendon Iron Co., Hibernia mines, Rockaway tp., Morris co.

723E. ——— Glendon shaft, 325 feet deep, Glendon Iron Co., Hibernia mines, Rockaway tp., Morris co.

723F. ——— Glendon shaft, No. 3, 325 feet deep, Glendon Iron Co., Hibernia mines, Rockaway tp., Morris co.

723G. ——— Glendon shaft, No. 4, 275 feet deep, Glendon Iron Co., Hibernia mines, Rockaway tp., Morris co.

723H. ——— Glendon shaft, No. 5, 275 feet deep, Glendon Iron Co., Hibernia mines, Rockaway tp., Morris co.

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723I. **IRON ORE**—Glendon shaft, No. 6, 250 feet deep, Glendon Iron Co., Hibernia mines, Rockaway tp., Morris co.

723J. ——— Bethlehem Iron Co.'s shaft, No. 2, 250 feet deep, Hibernia mines, Rockaway tp., Morris co.

723K. ——— Bethlehem Iron Co.'s shaft, No. 2, 250 feet deep, Hibernia mines, Rockaway tp., Morris co.

723L. ——— Bethlehem Iron Co.'s shaft, No. 2, 250 feet deep, Hibernia mines, Rockaway tp., Morris co.

723M. ——— Bethlehem Iron Co.'s shaft, No. 4, 250 feet deep, Hibernia mines, Rockaway tp., Morris co.

723N. ——— Bethlehem Iron Co.'s shaft, No. 4, 250 feet deep, Hibernia mines, Rockaway tp., Morris co.

The Hibernia mines consist of shafts and workings, all on one long and remarkably constant vein of ore. The Andover Iron Co. work the southwest end of this line, the Glendon Iron Co. has the middle, and the Bethlehem Iron Co. the northeast end of the range. The annual product of the three companies has reached, in the aggregate, 80,000 tons of ore.

724. ——— Beach Glen mine, Rockaway tp., Morris co.

724A. ——— Beach Glen mine, Rockaway tp., Morris co.

724B. ——— Beach Glen mine, Rockaway tp., Morris co.

Worked by the Boonton Iron Co.

*725. ——— Tichenor's openings, Rockaway tp., Morris co.

*726. ——— Righter mine, Rockaway tp., Morris co.

*727. ——— Meriden mine, Rockaway tp., Morris co.

*728. ——— Splitrock, or Cobb mine, Rockaway tp., Morris co.

729. ——— Splitrock Pond mine, Rockaway tp., Morris co.

*730. ——— Greenville mine, Rockaway tp., Morris co.

731. ——— Denmark mine, Denmark, Morris co.

*732. ——— Pardee mine, Rockaway tp., Morris co.

733. ——— Green Pond mines, south lease, Rockaway tp., Morris co.

733A. ——— Green Pond mines, big opening, Rockaway tp., Morris co.

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733B. **IRON ORE**—Big opening, No. 1 of middle lease, Green Pond mines, Rockaway tp., Morris co.

733C. ——— No. 2, of north lease, Green Pond mines, Rockaway tp., Morris co.

733D. ——— No. 6, of north lease, Green Pond mines, Rockaway tp., Morris co.

These mines have yielded a large amount of ore during the past year, and most of it has been used in the manufacture of Bessemer steel, at the Pennsylvania Steel Works, near Harrisburg, Pa.

*734. ——— Bancroft shaft, Rockaway tp., Morris co.

*735. ——— Charlottenburg mines, Rockaway tp., Morris co.

*735A. ——— Charlottenburg mines, Rockaway tp., Morris co.

735B. ——— Ryerson's east shaft, Charlottenburg mines, Rockaway tp., Morris co.

736. ——— De Camp mine, Rockaway Valley, Morris co.

736A. ——— Field vein, Reba mine, Rockaway Valley, Morris co.

736B. ——— Field vein, Reba mine, Rockaway Valley, Morris co.

*737. ——— Botts' farm, Pequannock tp., Morris co.

*738. ——— Decker farm, Pequannock tp., Morris co.

*739. ——— Gould's farm, Pequannock tp., Morris co.

*740. ——— Ryerson's tract, "Pike's Peak," Pequannock tp., Morris co.

*741. ——— Wynokie mines, Pompton tp., Passaic co.

*742. ——— Tellington mine, Pompton tp., Passaic co.

*743. ——— Rheinsmith mine, Pompton tp., Passaic co.

*744. ——— Monk's mine, Pompton tp., Passaic co.

*745. ——— Board mine, Pompton tp., Passaic co.

746. ——— Cannon mine, Ringwood, Passaic co.

This is a coarse granular or "shot ore." Large specimen in top of case.

746A. ——— Cannon mine, Ringwood, Passaic co.

746B. ——— Cannon mine, Ringwood, Passaic co.

This specimen is nearly all sesquioxide of iron, and is not magnetic.

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746C. **IRON ORE**—Hard mine, Ringwood, Passaic co.

746D. ——— Hard mine, Ringwood, Passaic co.

746E. ——— Miller mine, Ringwood, Passaic co.

746F. ——— Blue mine, Ringwood, Passaic co.

746G. ——— Old Blue mine, Ringwood, Passaic co.

746H. ——— Cooper mine, Ringwood, Passaic co.

746I. ——— Hope mine, Ringwood, Passaic co.

The Ringwood mines were opened and worked some time before the Revolution. They are now the property of Cooper, Hewitt & Co., and their ores are used at the furnaces at Ringwood, Passaic co., and at Durham, Pa., and selected Cannon mine ore is sold for puddling furnace lining. The veins are remarkable for their size and the superior quality of the ore. The total product of these mines to the present time is estimated at about 600,000 tons.

*746J. ——— Ward mine, Ringwood tract, Passaic co.
[See foot note.]

Mines of the Musconetcong Belt.

747. **IRON ORE**—Hager mine, Bethlehem tp., Hunterdon co.

A weathered specimen which has lost its sulphur.

748. ——— Bloom's mine, Little York, Hunterdon co.

749. ——— Brodrick & Co.'s mine, one mile west of Bethlehem, Hunterdon co.

749A. ——— Brodrick & Co.'s mine, one mile west of Bethlehem, Hunterdon co.

749B. ——— Brodrick & Co.'s mine, one mile west of Bethlehem, Hunterdon co.

750. ——— Harris mine, one mile west of Bethlehem, Hunterdon co.

751. ——— Bethlehem mine, east of Bethlehem, Hunterdon co.

*752. ——— Knight & Hartpence shaft, Bethlehem, Hunterdon co.

NOTE.—Ringwood furnaces, at Ringwood, Passaic co. Cooper, Hewitt & Co. Two furnaces—48 and 65 feet high; 13 and 16 feet boshes. Formerly used charcoal.

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753. **IRON ORE**—Church mine, Van Syckles, Bethlehem tp., Hunterdon co.

This mine is owned and worked by Cooper, Hewitt & Co. The ore goes to the Durham furnace. It contains a large per centage of titanic acid, and is reported to contain about 0.3 per cent. of vanadic acid.

754. ——— Miller farm, one mile southwest of Glen Gardner, Hunterdon co.

755. ——— Fritt's farm, White Hall, Hunterdon co.

756. ——— White Hall mine, (east,) Hunterdon co.

757. ——— Banghart's mine, near Glen Gardner, Hunterdon co.

*758. ——— Hunt, or Pidcock's mine, Schooley's Mountain, Hunterdon co.

*759. ——— Pleasant Grove mine, Schooley's Mountain, Morris co.

*760. ——— Wm. Hann farm, Schooley's Mountain, Morris co.

*761. ——— Stoutenburgh mine, Schooley's Mountain, Morris co.

*762. ——— Naughtright mine, near Naughtrightville, Morris co.

*763. ——— Sharp's mine, Schooley's Mountain, Morris co.

*764. ——— Rarick farm, Schooley's Mountain, Morris co.

*765. ——— Cook & McAuley shaft, Schooley's Mountain, Morris co.

*765A. ——— Hopler farm, Bartleyville, Morris co.

767. ——— A. L. Solomon's mine, Mount Olive, Morris co.

767A. ——— A. L. Solomon's mine, Mount Olive, Morris co. Ore near surface.

768. ——— J. Drake's mine, Mount Olive, Morris co.

768A. ——— J. Drake's mine, Mount Olive, Morris co.

769. ——— Fisher's mine, Beattyestown, Morris co.

769A. ——— Fisher's mine, Beattyestown, Morris co.

769B. ——— Fisher's mine, Beattyestown, Morris co.

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769c. **IRON ORE**—Fisher's mine, Beattyestown, Morris co. This specimen consists almost exclusively of sesquioxide of iron.

*770. ——— Dickinson mine, Schooley's Mountain, Morris co.

*771. ——— Marsh mine, Schooley's Mountain, Morris co.

*772. ——— Smith mine, Schooley's Mountain, Morris co.

*773. ——— Warne & Shouse tunnel, Schooley's Mountain, Morris co.

774. ——— Cramer mine, Schooley's Mountain, Morris co.

*775. ——— Lanning farm, near Oxford Furnace, Warren co.

*776. ——— Chapin and Lommasson mine, near Oxford Furnace, Warren co.

777. ——— New mine, Oxford Furnace, Warren co.

777A. ——— Car-wheel vein, Oxford Furnace, Warren co.

777B. ——— Staley vein, Oxford Furnace, Warren co.

777C. ——— Harrison vein, Oxford Furnace, Warren co.

Three of these *veins* are now worked, viz: the New, Car-Wheel and Staley. The veins are large, and the ore of very superior quality.

[See foot note.]

*778. ——— Confucius, or Creager mine, near Port Murray, Warren co.

*779. ——— Mitchell mine, near Port Murray, Warren co.

*780. ——— Johnson's diggings, near Port Murray, Warren co.

781. ——— Egbert Church, or Smith mine, two miles northwest of Port Murray, Warren co.

*782. ——— Rockport mine, near Rockport, Warren co.

783. ——— Bald Pate mine, two miles northwest of Port Murray, Warren co.

NOTE.—The Oxford Furnace Co. own these mines, together with two blast furnaces, rolling mill and nail works. The oldest furnace was erected in 1742, and it was originally worked with charcoal. The furnaces are thirty-six and fifty feet high; nine feet ten inches, and eighteen feet across the boshes. Annual capacity is 15,700 tons, and nearly all this is worked into spikes and nails. A piece of pig iron, bearing the date 1755, is in the upper part of the case. This is, probably, one of the oldest pieces of iron of American manufacture in the country, whose *age* is known.

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783A. **IRON ORE**—Bald Pate mine, two miles northwest of Port Murray, Warren co.

783B. Bald Pate mine, northwest of Port Murray, Warren co.

*784. ——— Searle's mine, Port Murray, Warren co.

*785. ——— Buck's Hill, Hackettstown, Warren co.

*786. ——— Frase's farm, near Warrenville, Warren co.

*787. ——— Young farm, near Warrenville, Warren co.

*788. ——— Pyle's farm, near Warrenville, Warren co.

*789. ——— Axford farm, near Warrenville, Warren co.

790. ——— Bryant mine, one mile southeast of Warrenville, Warren co.

Some ore from this mine is in the Gelogical Series of Azoic rocks. It is quite lean, and is a syenite containing magnetite, rather than an ore. As such it is typical of several other localities of ore and ore-bearing rocks in this belt.

*791. ——— Excelsior mine, north of Hackettstown, Warren co.

*792. ——— Eureka mine, north of Hackettstown, Warren co.

*793. ——— Brookfield, or Waterloo mine, north of Hackettstown, Warren co.

794. ——— Gove mine, near Drakesville, Morris co.

795. ——— Hurd mine, Hurdtown, Morris co.
This is coarse granular ore.

795A. ——— Hurd mine, Hurdtown, Morris co.
Fine granular ore.

795B. ——— Hurd mine, Hurdtown, Morris co.
Slickensides ore surfaces Large block in top of case.

795C. ———Hurd mine, Hurdtown, Morris co.
Lean ore and rock, with slickensides.

The Hurd mine is noted for its great length of slope, (about 1,000 feet), descending on the *bottom rock* of the *shoot* of ore towards the northeast, at an angle of twenty-two degrees. It yields a large amount of very rich ore, which is uses in the furnaces of the lessees, the Glendon Iron Co., at Glendon, Pa

Over the case of minerals a map of the surface, with longitudinal and horizontal sections, may be seen. These show the occurrence of ore as opened in this mine.

NOTE.—There is a new furnace at Hackettstown, which is now out of blast.

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*796. **IRON ORE**—Weldon mine, Jefferson tp., Morris co. In this mine there are two parallel *shoots* of ore. Their relative position and size are shown by the map and sections placed above the case of iron ores.

*797. ——— Lower Weldon mine, Jefferson tp., Morris co.

*798. ——— Johnson farm, Jefferson tp., Morris co.

*799. ——— Elliott mine, May's mt., Jefferson tp., Morris co.

*800. ——— Dodge mine, Jefferson tp., Morris co.

801 ——— Ford mine, Jefferson tp., Morris co.

801A, B, C, D, E. ——— Ford mine, Jefferson tp., Morris co.

These *six* specimens represent the variety of ore raised from this mine. The ore is shipped to the Musconetcong Iron works, at Stanhope, Sussex co.

[See foot note.]

*802. ——— Scofield mine, Jefferson tp., Morris co.

*803. ——— Davenport mine, Jefferson tp., Morris co.

*804. ——— Boss mine, Jefferson tp., Morris co.

*805. ——— Fraser mine, Jefferson tp., Morris co.

*806. ——— Goble mine, Jefferson tp., Morris co.

*807. ——— Shongum mine, Jefferson tp., Morris co.

808. ——— Cascade or Smith mine, Byram tp., Sussex co.

809. ——— Allis mine, Byram tp., Sussex co.

810. ——— French's mines, Byram tp., Sussex co.

811. ——— Hude, or Stanhope mine, one mile north of Stanhope, Sussex co.

811A. ——— Hude, or Stanhope mine, one mile north of Stanhope, Sussex co.

811B. ——— Hude, or Stanhope mine, one mile north of Stanhope, Sussex co.

811C. ——— Hude, or Stanhope mine, one mile north of Stanhope, Sussex co.

The surface and open workings here are yielding a large amount of ore, which is made into Bessemer pig metal.

NOTE.—Musconetcong Iron Works; two furnaces; height of stack, 55 and 80 feet; diameter of boshes, 17 and 20 feet; ores, magnetic, from Ford, Davenport, Connet and other New Jersey mines, with some hematite from Beattyestown, Warren co.

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*812. **IRON ORE**—Wright's mine, two miles north of Stanhope, Sussex co.

*813. ——— Silver mine, Byram tp., Sussex co.

*814. ——— Haggerty mine, Byram tp., Sussex co.

815. ——— Sickles mine, Sparta tp., Sussex co.

815A. ——— Sickles mine, Sparta tp., Sussex co.

816. ——— Gafney mine, Byram tp., Sussex co.

816A. ——— Gafney mine, Byram tp., Sussex co.

816B. ——— Gafney mine, Byram tp., Sussex co.

817. ——— Lawrence farm, Byram tp., Sussex co.

818. ——— Sherman mine, east of Sparta, Sussex co.

819. ——— Bunker mine, east of Sparta, Sussex co.

820. ——— Musconetcong Iron Works mine, Ogden mines, Sparta tp., Sussex co.

820A, B, C, D, E. ——— Musconetcong Iron Works mine, Ogden mines, Sparta tp., Sussex co.

820F. ——— Allentown Rolling Mill Co.'s mine, Ogden mines, Sparta tp., Sussex co.

820G. ——— Allentown Rolling Mill Co.'s mine, Ogden mines, Sparta tp., Sussex co.

820H. ——— Davenport mine, Ogden mines, Sparta tp., Sussex co.

The Ogden mines form one of the most productive groups of mines in the State. Since the building of the Ogden Mine R. R. a large amount of ore has been sent away annually to Stanhope, Allentown, Pa., and other places. One of the specimens, 820E, exhibited, is quite lean. It is shown as typical of the occurrence of magnetite, and not as an ore.

*821. ——— Greer farm and Franklin Iron Co.'s mines, Hardyston tp., Sussex co.

*822. ——— Hopewell Forge mine, Hopewell, Sussex co.

*823. ——— Kimble farm, West Milford tp., Passaic co.

*824. ——— Budd and Hunt Tract mine, West Milford tp., Passaic co.

*825. ——— Scranton and Rutherfurd Tract mine, West Milford tp., Passaic co.

Hosted by Google

*826. **IRON ORE**—Jennings and Rutherfurd line, West Milford tp., Passaic co.

827. ——— Canistear mine, Vernon tp., Sussex co.

*828. ——— Tracey and Crane farms, Vernon tp., Sussex co.

*829. ——— Henderson mine, Vernon tp., Sussex co.

*830. ——— Clinton Tract mine, West Milford tp., Passaic co.

831. ——— Williams mine, Vernon tp., Sussex co.

831A. ——— Williams mine, Vernon tp., Sussex co.

*332. ——— Segur and Wright Lease mine, Vernon tp., Sussex co.

*833. ——— Jacob Hunt farm, Vernon tp., Sussex co.

834. ——— Wawayanda mine, Vernon tp., Sussex co.

This mine belongs to the Thomas Iron Co. Its ore was formerly used in the Wawayanda Charcoal Furnace, belonging to the same company.

*835. ——— Green mine, Vernon tp., Sussex co.

*836. ——— Ten Eyck's openings, West Milford, Passaic co.

*837. ——— E. H. Wright's mine, Vernon tp., Sussex co.

Mines of the Pequest Belt.

*839. **IRON ORE**—Schuler opening, near Roxburgh, Warren co.

*840. ——— Roseberry mine, one mile southeast of Belvidere, Warren co.

841. ——— Barton mine, one-half mile south of Oxford, Warren co.

This mine is worked for the Durham Furnaces.

*842. ——— Shoemaker's diggings, near Oxford, Warren co.

*843. ——— Redell mine, near Oxford, Warren co.

*844. ——— Little mine, near Oxford, Warren co.

845. ——— Raub farm, one mile northwest of Oxford Furnace, Warren co.

Hosted by Google

*847. **IRON ORE**—Pequest mine, two miles north of Oxford Furnace, Warren co.

848. ——— Henry tunnel, (Pequest mine), two miles north of Oxford Furnace, Warren co.

*849. ——— Hoit farm, two miles north of Oxford Furnace, Warren co.

The Pequest mine and adjoining Hoit farm have furnished a portion of the stock for the Pequest furnace.

[See foot note.]

850. ——— Smith's mine, near Green's Pond, Hope tp., Warren co.

851. ——— Hendershot farm or Barnes' mine.

852. ——— Kishpaugh mine, two and one-half miles west of Danville, Jenny Jump mountain, Warren co.

This is a comparatively new mine, and is owned and worked by the Crane Iron Company, of Catasauqua, Pennsylvania. A large amount of ore has been taken from it and made into Bessemer steel.

*853. ——— Welch and Inschow lots, Jenny Jump mountain, Warren co.

*854. ——— Stiff farm, Jenny Jump mountain, Warren co.

*855. ——— Potter farm, Jenny Jump mountain, Warren co.

*856. ——— Garrison farm, Jenny Jump mountain, Warren co.

*857. ——— Davis farm, Jenny Jump mountain, Warren co.

*858. ——— Albertson farm, Jenny Jump mountain, Warren co.

*859. ——— Shaw farm, Jenny Jump mountain, Warren co.

860. ——— Howell farm, northeast end of Jenny Jump mountain, Warren co.

860A. ——— Howell farm, northeast end of Jenny Jump mountain, Warren co.

860B. ——— Howell farm, northeast end of Jenny Jump mountain, Warren co.

*861. ——— Carroll farm, near Danville, Warren co.

NOTE.—This furnace is on the line of the D. L. and W. R. R., two miles north of Oxford Furnace, Warren county. The stack is fifty-eight feet high, and the bosh sixteen feet in diameter. It is not now in blast.

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*862. **IRON ORE**—Schaeffer farm, near Warrenville, Warren co.

863. ——— Lesbie shaft, Warrenville, Warren co.

Duplicate specimen, as ore-bearing rock, as No. — of this collection.

864. ——— Maring farm, Wight's lease, Warrenville, Warren co.

*865. ——— Haggerty's diggings, near Warrenville, Warren co.

866. ——— Decker farm, Glendon Iron Co., two miles southwest of Andover, Sussex co.

867. ——— Andover mine, Andover, Sussex co.

867A. ——— Andover mine, Andover, Sussex co.

867B. ——— Andover mine, Andover, Sussex co.

This mine has yielded an enormous quantity of superior ore, containing some manganese. It is not now worked.

*868. ——— Sulphur Hill mine, Andover, Sussex co.

*869. ——— McKean farm, Sussex co.

870. ——— Roseville mine, Roseville, Sussex co.

*871. ——— Tar Hill mine, Sussex co.

872. ——— Franklin mines, Hill vein, Franklin Furnace, Sussex co.

872A. ——— **Magnetite in Calcite**—Franklin mines, Furnace vein, Franklin Furnace, Sussex co.

The ore at Franklin Furnace occurs in beds in the white, crystalline limestone. It is of excellent quality. It was formerly used in the old furnace at this place.

[See foot note].

*873. **IRON ORE**—Green's mine, Pochuck mt., Sussex co.

*874. ——— Bird mine, Pochuck mt., Sussex co.

The location of the several Magnetic iron ore mines and the openings made for iron ore, and the boundaries of the four belts of Azoic rocks, according to which subdivision the mines are grouped, are shown on the Geological Map of Northern New Jersey, 1874. The mines about Dover, Morris county, are more plainly marked on the "Topographical Map of a group of iron mines near Dover."

NOTE.—The new furnace at Franklin Furnace has a stack sixty-seven feet high, and boshes twenty-three feet in diameter. It is out of blast.

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HEMATITE.

880. **RED HEMATITE**—Mine on Marble mountain, Warren co.

881. ——— Titman shaft, Bridgeville, Warren co.

882. ——— Andover mine, Andover, Sussex co.

882A. ——— Andover mine, Andover, Sussex co.

LIMONITE, OR BROWN HEMATITE.

884. **BROWN HEMATITE, or LIMONITE**—Bird mine, near Clinton, Hunterdon co.

*885. ——— German Valley, Morris co.

*886. ——— Carpentersville, Warren co.

*887. ——— Hamlen mine, Greenwich tp., Warren co.

888. ——— Thatcher mine, Stewartsville, Warren co.

888A. ——— Thatcher mine, Stewartsville, Warren co.

888B. **SAND,** (*from a Hematite Bomb*)—Thatcher mine, Stewartsville, Warren co.

This is comparatively a new mine, but very productive of ore of a superior quality. A large amount has been shipped to the Bethlehem Iron Co.'s Works, Bethlehem, Pa.

*889. **BROWN HEMATITE**—New Village, Warren co.

*890. ——— Broadway, Warren co.

891. ——— Shield's farm, Beattyestown, Warren co.

891A. ——— Shield's farm, Beattyestown, Warren co.

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891B. **BROWN HEMATITE**—Shield's farm, Beattyestown, Warren co.

From pits of the Musconetcong Iron Works.

891C. ——— Shield's farm, Beattyestown, Warren co.

891D. ——— Shield's farm, Beattyestown, Warren co.

Pits of the Thomas Iron Co.

891E. **SPATHIC IRON ORE**—Shield's farm, Thomas Iron's pits, Beattyestown, Warren co.

891F. ——— **with Limonite**—Shield's farm, Thomas Iron's pits, Beattyestown, Warren co.

On this Shield's farm there are three companies raising ore, viz: the Thomas Iron Co., the Musconetcong Iron Works, and the Boonton Iron Co. The Musconetcong Iron Works at Stanhope get the most of the aggregate amount raised on this property.

*892. **BROWN HEMATITE**—Shiloh, Warren co.

893. **SIDERITE, or SPATHIC IRON ORE**—Cedar Hill mine, McAfee Valley, Sussex co.

894. **BROWN HEMATITE**—Pochuck mine, McAfee Valley, Sussex co.

894A. ——— Pochuck mine, McAfee Valley, Sussex co.

894B. ——— Pochuck mine, McAfee Valley, Sussex co.

The hematite here occurs in a large bed in the gneissic rock, and is opened by subterranean workings, similar to the magnetic iron ore mines of the state. It belongs to the Lackawanna Iron and Coal Co., and it is capable of yielding annually a large amount of rich ores.

895. ——— I. P. Cooley's farm, near Greenwood Lake, Passaic co.

*896. **BOG IRON ORE, Limonite**—Atsion, Burlington co.

897. ——— Near Jacksonville, Middlesex co.

Hosted by Google

ZINC ORES.

Ores of zinc are mined at Stirling Hill and Mine Hill, in Sussex co. The maps give a fair idea of the location and structure of the beds of ore. Oxide, and silicate of zinc, and franklinite are the principal ores. The specimens are a fair exhibit of the ores. Much of it is worked directly into the white oxide, for painters' use; but there is a large quantity used in making spelter of a superior grade. The residuum left after making zinc oxide, contains oxides of iron and manganese, and is used in making spiegel-eisen.

897. **Franklinite and Willemite**—New Jersey Zinc Co.'s mines, Franklin Furnace, Sussex co.

898. **Franklinite and Zincite**—New Jersey Zinc Co.'s mines, Franklin Furnace, Sussex co.

899. **Franklinite and Willemite**—New Jersey Zinc Co.'s mines, Franklin Furnace, Sussex co.

899A. **Franklinite, Willemite and Smithsonite**—New Jersey Zinc Co.'s mines, Franklin Furnace, Sussex co.

900. **Franklinite, Willemite and Zincite**—New Jersey Zinc Co.'s mines, Franklin Furnace, Sussex co.

901. **Willemite and Franklinite, with Trap Dike**—New Jersey Zinc Co.'s mine, Franklin Furnace, Sussex co.

One block of ore traversed by two narrow dikes under the case.

902. **Franklinite in Limestone**—Franklin Furnace, Sussex co.

902A. **Crystalline Limestone, with Franklinite**—Stirling Hill, Sussex co.

903. **Franklinite,** (*massive*)—Passaic Zinc Co.'s mine, Stirling Hill, Sussex co.

Hosted by Google

904. **Willemite**—Passaic Zinc Co.'s mine, Stirling Hill, Sussex Co.

905. **Willemite and Franklinite**—Passaic Zinc Co.'s mines, Stirling Hill, Sussex Co.

905A. **Franklinite, Willemite and Zincite**—Passaic Zinc Co.'s mine, Stirling Hill, Sussex co.

906. **Calamine**—Passaic Zinz Co.'s mine, Stirling Hill, Sussex Co.

Several blocks of ore coated with crystals of calamine are in the top of the case.

The hanging wall and the foot wall of the vein of zinc ore in the Passaic Zinc Co.'s mine, at Stirling Hill, are also in the case, but not numbered.

The gangue rock, which has the form and appearance of calcite, contains a considerable percentage of carbonate of manganese. This causes it to weather to a manganese brown in exposed specimens.

Under the case of zinc ores are two large blocks of ore, one mostly zincite, the other mostly franklinite. These and the calamine in the top of the case are from the mines of the Passaic Zinc Co., Stirling Hill.

907. **Zinc Ore,** (*Sphalerite or Blende*)—P. Raub's farm, near Oxford, Warren co.

In crystalline limestone.

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Ores of Copper, Lead and Arsenic.

These ores occur at many localities, but in small quantities only; and there are no mines which are now worked. The copper ores of a few of these localities are exhibited as typical of the modes of occurrence.

910. **COPPER ORE**—Schuyler mine, Belleville, Essex co.
911. ——— Near Plainfield, Somerset co.
912. ——— (*Carbonates*)—New Brunswick, Middlesex co.
913. ——— Griggstown, Somerset co.
*914. ——— Flemington mine, Hunterdon co.
923. ——— Pahaquarry Copper mine, Pahaquarry, Warren co.
924. **LEAD ORE**, (*Galenite*)—Sussex Lead mine, Howellsville, Sussex co.
925. **ARSENICAL IRON ORE**, (*Arsenopyrite*)—Mine, northeast end of Jenny Jump mountain, Warren co.

Clays.

Nearly all of the Fire and Potters' clays of the State are included in the list of specimens from the Cretaceous Formation, Nos. 290 to 353 of this catalogue. The remaining unclassified specimens are here appended.

926. **FIRE CLAY**, (*washed*)—Jas. Conrad's pits, Conrad, Gloucester co.
927. ——— (*crude*)—Jas. Conrad's pits, Conrad, Gloucester co.
928. **PIPE CLAY**—Union Clay Co.'s pits, Woodmansie, Burlington co.
929. ——— Townsend's pits, Wheatland Station, (N. J. S. R. R.,) Burlington co.
930. **CLAY**—Jos. Nugent's farm, near Tuckerton, Burlington co.
931. ——— J. F. Cordery's lands, Absecon, Atlantic co.

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GLASS SAND.

The Glass Sand localities are nearly all in the southern part of the State. They supply the material for making window glass, hollow ware, &c. One-third of the window glass and a large part of the hollow ware manufactured in the United States, is made at the several works in this State.

935. **GLASS SAND**—Pits of Thos. Richards, Jr., Jackson, Camden co.

936. ——— (*coarse*)—Hon. Andrew K. Hay's pits, Winslow, Camden co.

936A. ——— (*fine*)—Hon. Andrew K. Hay's pits, Winslow, Camden co.

937. ——— Hurf & Bro.'s pits, near Williamstown, Gloucester co.

938. ——— Pits along the Maurice river, South Vineland, Cumberland co.

From Whitall, Tatum & Co., of Millville.

939. ——— Pits along Maurice river, three miles south of Millville, Cumberland co.

940. **SAND**, (*for glass*)—Dr. T. T. Price's lands, Tuckerton, Burlington co.

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SAND FOR CASTINGS, MOULDING, &C.

941. **SAND**—Boonton Iron Co.'s pits, Flanders, Morris co.

942. ——— Carey's pits, Flanders, Morris co.

941 and 942 belong in the rocks of the Potsdam Period.

943. **MOULDING SAND**—Otto Ernst's farm, Chesquakes, South Amboy tp., Middlesex co.

944. ——— A. Hall & Son's pits, Woodbridge, Middlesex co.

Overlying the fire clay.

945. **FOUNDRY SAND**—Whitehead Bros.' pits, two miles west of Burts Creek, South Amboy tp., Middlesex co.

945A. **MICACEOUS SAND**, ("*Clay Kaolin*")—Whitehead Bros.' pits, two miles west of Burts Creek, South Amboy tp., Middlesex co.

945B. ——— ("*Blue Kaolin*")—Whitehead Bros.' clay pits, South Amboy tp., Middlesex co.

946. **FIRE SAND**—W. N. Weidener's pits, Perth Amboy, Middlesex co.

947. ——— R. N. & H. Valentine's pits, Sand Hills, Raritan tp., Middlesex co.

948. ——— M. Compton's pits, southeast of Bonhamtown, Middlesex co.

949. **SAND**, (*coarse*)—M. Compton's pits, southeast of Bonhamtown, Middlesex co.

949A. ——— (*fine*)—M. Compton's pits, southeast of Bonhamtown, Middlesex co.

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MISCELLANEOUS PRODUCTS.

950. **BARITE,** (*Sulphate of Baryta*)—Anderson farm, three miles west of Newton, Sussex co.

951. ——— Hopewell, Mercer co.

952. **GRAPHITE,** (*Black Lead*)—Wm. Current's farm, near Ogdensburg, Sussex co.

952A. ——— Engelmann's farm, near Peapack, Morris co.

953. **STEATITE**—Marble mountain, Warren co.

954. **MICA**—Broadway, Warren co.

955. **MANGANESE ORE,** (*Pyrolusite and Braunite*)—Merrill's mine, one mile southeast of Clinton, Hunterdon co.

956. ——— Henry Radley's pits, Lebanon, Hunterdon co.
Used as paint.

957. **MOLYBDENITE**—Hude or Stanhope mine, Stanhope, Sussex co.

957A. **MOLYBDIC OCHRE**—Hude or Stanhope mine, Stanhope, Sussex co.

958. **PEAT**—Mead's Basin, Morris co.
Prepared according to the Elsberg process.

959. **PEATY EARTH,** ("*Blue Earth*")—J. R. Perrine's farm, Manalapan, Monmouth co.
Containing phosphate of iron.

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METALLURGICAL PRODUCTS.

Zinc.

SPELTER—New Jersey Zinc Co.'s works, Newark, Essex co.

SPELTER STATUETTE—New Jersey Zinc Co.'s works, Newark, Essex co.

OXIDE OF ZINC—New Jersey Zinc Co.'s works, Newark, Essex co.

SPIEGEL-EISEN—New Jersey Zinc Co.'s works, Newark, Essex co.

Made from residuum of Zinc furnaces.

SPELTER—Passaic Zinc Co.'s works, Jersey City, Hudson co.

OXIDE OF ZINC—Passaic Zinc Co.'s works, Jersey City, Hudson co.

Iron.

BLOOM OF IRON—Made at the Shippenport forge, Morris co.

Donor, Fred. A. Canfield.

CAST IRON, (*Spiegel-eisen*) — Made from Andover mine ore, at Sussex Iron Co.'s furnace, Stanhope, Sussex co., 1855.

MALLEABLE IRON—Made from Andover mine ore, at Sussex Iron Co.'s furnace, Stanhope, Sussex co., 1855.

PIG IRON—Oxford Furnace, Warren co.

Made in 1755, in the old charcoal furnace.

Loaned by S. T. Scranton, Esq., President of Oxford Iron Co.

——— **No. 1**—Oxford Iron Co., Oxford Furnace, Warren co.

——— **No. 2**—Oxford Iron Co., Oxford Furnace, Warren co.

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PIG IRON, No. 1, (*Forge*)—Oxford Iron Co., Oxford Furnace, Warren co.

——— (*White*)—Oxford Iron Co., Oxford Furnace, Warren co.

——— (*Mottled*)—Oxford Iron Co., Oxford Furnace, Warren co.

MERCHANT BAR IRON—Oxford Iron Co., Oxford Furnace, Warren co.

R. R. SPLICE BAR BOLTS—Oxford Iron Co., Oxford Furnace, Warren co.

SHIP SPIKES—Oxford Iron Co., Oxford Furnace, Warren co.

R. R. SPIKES, (*bent cold*)—Oxford Iron Co., Oxford Furnace, Warren co.

NAILS, (*bent cold*)—Oxford Iron Co., Oxford Furnace, Warren co.

PIG IRON, (*samples*)—Andover Iron Co., Phillipsburg, Warren co.

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MANUFACTURES.

Fire Bricks, Bricks, Pottery, Tile, Glass Ware.

FIRE BRICK, No. 1 and No. 2—Salamander works, Wm. Poillon, pres't, Woodbridge, Middlesex co.

——— **No. 1 and No. 2**—National Fire Brick works, Chas. Anness & Son, Woodbridge, Middlesex co.

——— **Extra, No. 1 and No. 2**—M. D. Valentine & Brother, Woodbridge, Middlesex co.

——— **No. 1 and No. 2**—Wm. H. Berry & Co.'s works, Woodbridge, Middlesex co.

——— **No. 1, No. 2, and Silica Brick**—A. Hall & Sons, Perth Amboy, Middlesex co.

——— **[A]**—Watson Fire Brick manufactory, John R. Watson, Perth Amboy, Middlesex co.

——— **No. 1 and No. 2**—Crossman Clay and Manufacturing Co., Woodbridge tp., Middlesex co.

——— **No. 1 and No. 2**—Adamantine Brick works, Sayre & Fisher, Sayreville, on the Raritan river, South Amboy tp., Middlesex co.

FRONT BRICK, light colored—A. Hall & Sons, Perth Amboy, Middlesex co.

——— Sayre & Fisher, Sayreville, South Amboy tp., Middlesex co.

Plain and ornamented.

HOLLOW BRICK—C. W. Boynton & Co.'s works, Woodbridge Neck, Middlesex co.

LAND TILE—C. W. Boynton & Co.'s works, Woodbridge Neck, Middlesex co.

FLOWER POTS—Geo. Such, South Amboy, Middlesex co.

Made of clay, (natural color).

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FIRE BRICK—Conrad, Gloucester co.

These bricks represent nearly all of the fire-brick works in the State, and fairly represent the quality of brick made from New Jersey clays. In addition to that used in these works, a large amount of fire clay is sent to works in New York and Pennsylvania.

C. C. WARE—Glasgow Potteries, Trenton, Mercer co., John Moses & Co.

Made of Woodbridge clay.

ALUM.

Made from Woodbridge clay.

From Hon. Chas. A. Campbell, of Woodbridge.

GLASS AND GLASSWARE—Whitall, Tatum & Co., Millville, Cumberland co.

——— Bodine & Son's works, Tansborough, Gloucester co.

Fossils.

Characteristic fossils of the Trenton, Hudson, Lower Helderberg, Oriskany, Cauda Galli, Onondaga, Corniferous and Marcellus periods are found in the state, as also of the Triassic, Cretaceous and Tertiary periods, but no attempt has been made to exhibit full series of them. The Cretaceous and Eocene are notably rich in organic remains.

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MAPS.

Geodetic Map.

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Geological Maps.

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5. ——— **of the Cretaceous Formation**—Scale, two miles to one inch.
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8. **Topographical Map of a Group of Iron Mines**, near Dover, Morris co., on a scale of three inches to a mile.
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